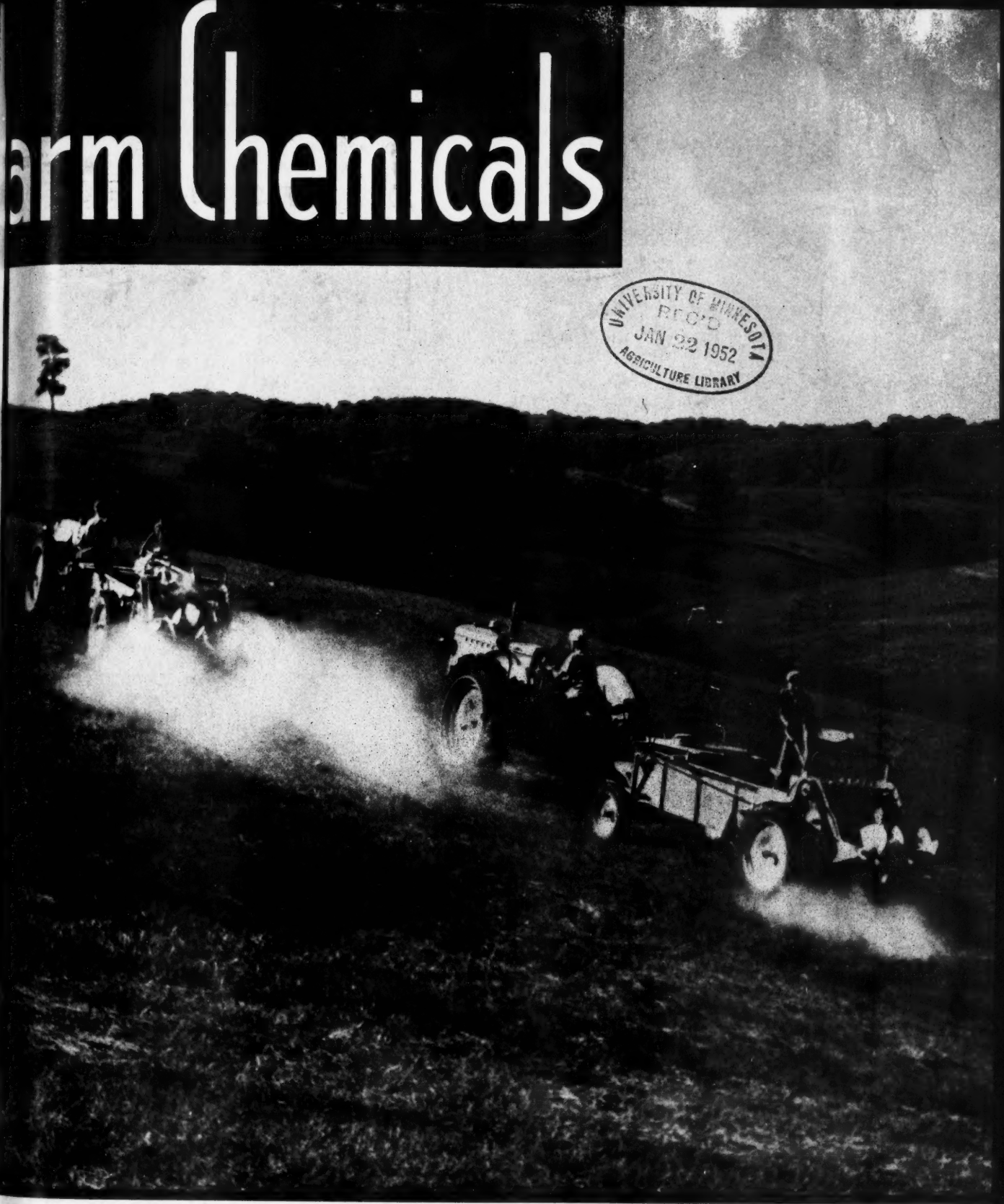
arm Chemicals



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Arcadian*, *the American* Nitrate of Soda
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NO. 3
OF A SERIES
ON HOW TO

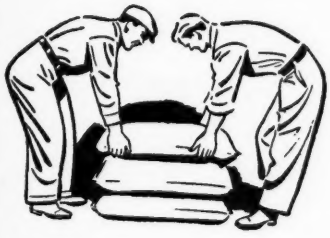
Stretch a MULTIWALL Paper Bag

Kraft paper supplies are short. So it is important for you to get the best use from your multiwalls. Here are some of the ways to stretch them . . .

Use of Hand Trucks . . . Trucks (and chutes and conveyors) should be free of protruding nails, splinters, etc.

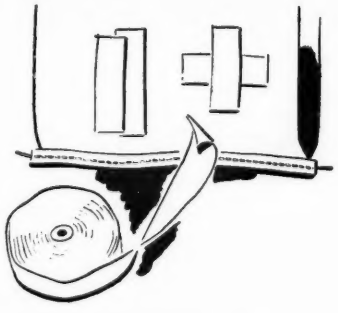
Two-wheel trucks should have wide, extended lips, as narrow-blade lips cut into the sacks. Wood or metal lip extensions may be added. Sacks should be piled flat. Small wooden pallets may be used if the truck lip is adequate.

On four-wheel trucks, sacks should be stacked flat and even with the truck edges, with the end sacks interlocked.



How to Lift and Carry . . . One man should pick up the sack with his hands underneath it, preferably at diagonal corners. Two men should lift the sack with the hands underneath it, supporting the four corners.

Never grip or pull at the corners. Never drag the sack across the floor. Never, with a tied closure, pull at the closed end. Carry the sack with the edge resting against the body, or flat on the shoulder.



How to Repair or Overslip Damaged Bags

If seriously damaged, slip an overslip over the damaged bag (with contents intact), then close with a wire-tie or string, or roll the top down and staple it.

If the damage is minor, or an overslip is not available: **1.** Straighten paper near the tear; place torn ply or plies in original position; clean off any loose material or dirt. **2.** Apply moistened gummed tape, cut 4 or 5 inches longer than the tear. Use single, overlapping, or crossed patches, depending on size and kind of tear. **3.** If more than one ply is severely ruptured, patch each ply separately.

A 3-inch, 40-lb. or 50-lb. gummed kraft tape is satisfactory. Carry repaired sacks with the patched side up.

Want the Whole Story?

Ask your Bemis Man for free, illustrated copy of Bemis Multiwall Packaging Guide. It deals with Storage, Filling and Closing, Handling, Palletizing and other important subjects.

• • •

Maybe Cotton Bags are Your Answer . . . if you can't get all of the multiwalls you need. Cotton bags are available . . . and Bemis is the leading cotton bag source.

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LION provides one-stop nitrogen service to Southern fertilizer manufacturers

Lion Anhydrous Ammonia — Manufactured in Lion's modern plant to an 82.25% nitrogen content under accurate chemical control, the uniformity and high quality of this basic product are assured.

Lion Aqua Ammonia — This product is available to manufacturers for use in the formulation of mixed fertilizers or for sale as direct application material. Normally about 30% ammonia, its content can be controlled by order to suit your needs.

Lion Nitrogen Fertilizer Solutions — Made specifically for the manufacturing of mixed fertilizers, these products supply both ammonia nitrogen and nitrate nitrogen in the ratios desired. They are easily handled and available in three types designed for varying weather conditions, and for formula requirements in the production of fertilizers that cure rapidly, store well and drill evenly.

Lion Ammonium Nitrate Fertilizer — The improved spherical white pellets in this product contain a guaranteed minimum of 33.5% nitrogen. They flow freely, resist caking and store much better. Lion Ammonium Nitrate Fertilizer is shipped in 100-pound, 6-ply bags with two moisture-proof asphalt layers.

Lion Sulphate of Ammonia — This new, superior-type sulphate is guaranteed to contain a minimum of 21% nitrogen. Through special conditioning of the larger crystals, moisture and free acid content is greatly reduced. These factors, together with the special coating applied, make for greater resistance to caking in shipment or in storage. This product flows freely. It is shipped in bulk and in 100-pound, 6-ply bags laminated with asphalt.

"Serving Southern States"

Technical advice and assistance to fertilizer manufacturers in solving their manufacturing problems is available for the asking . . . just write.

LION OIL COMPANY

Chemical Division • El Dorado, Arkansas

In this issue . . .

How much sulfur will be available in 1952? How much nitrogen can I count on using during the year? What's the situation in potash, superphosphate, steel and copper? Members of the farm chemicals industry have been asking each other (and themselves) these and many other questions about conditions in the new year. No one seems to have any concrete answers on the subject, but many persons and organizations have offered opinions as to probabilities of production and availability of chemicals necessary to formulators and mixers of fertilizers and pesticides. As a service to its readers, the staff of FARM CHEMICALS has compiled, in paragraph form, a summary of the outlook for 1952 in many phases of the industry. The article is on page 13. An editorial of comment on the situation may be found on page 7.

"If the acute shortage of sulfur from which France suffered in the period 1939 to 1945 was one of the main causes of technical progress in this field, there appears to be no obstacle to the application of this progress elsewhere in the world." That's how M. Massanet summarizes his article on the world shortage of sulfur, which appears on page 19. In order to reduce the danger of a sulfur shortage in the world, he writes, it must be reduced in the United States, which alone represents more than 50 per cent of the world fertilizer market and where technical skill is so developed as to allow the setting of an example.

The fertilizer industry has had a reputation for poor housekeeping, M. F. Wharton Sr., vice president of Arizona Fertilizers, Inc., declares in this month's article on farm chemicals plant safety. The writer cites poor housekeeping methods that he thinks are costly to industry and suggests some very good ways of remedying the situation that prevails in many plants.

When manpower can be reduced from seven to two and production increased from 25 tons an hour to 35, the industry ought to know about it. That's why we are printing the article on the use of Mobilift fork lift trucks with bag attachment in this issue. The story of their use in a Virginia-Carolina Chemical Corporation plant is described and illustrated on page 28.

Those long awaited sulfur and sulfuric acid limitation orders finally were sent out to industry. As expected, sulfur is restricted to 90 per cent of that used in the calendar year 1950. For full details, see the article on page 52.

farm chemicals

Formerly
American Fertilizer & Allied Chemicals

Established 1894

PIONEER JOURNAL OF THE FARM CHEMICALS INDUSTRY

Vol. 114 **DECEMBER, 1951** **No. 12**

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Cover Story

Farmers will be spreading superphosphate on their land comes spring, but chances are they won't be using as much as in former seasons. The reason is simple. Shortage of sulfur has resulted in a shortage of superphosphate. The men in the cover photo are spreading the material on a pasture on the Rolfe Lee farm, Mason County, W. Va. For further information on the superphosphate situation during 1952, see the Outlook article on page 13.

—Photo by U.S.D.A.

A magazine international in scope and circulation and devoted to manufacturers, mixers, and formulators of fertilizers and pesticides

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IMPORTANT ANGLE ON FARM PROFITS

Fifty years ago a team like this was just about the finest farm machinery you could lay your hands on. While mules still have their place on many farms, today's successful farmer depends more on motorized tools to lighten his labors, reduce his risks and increase his profits.

Among the many modern techniques for making farming pay, none are so important as the wise use of fertilizers best suited to maintain or enrich the productivity of the soil.

Many of the most effective fertilizers are compounded with potash, often with Sunshine State Potash, a product of New Mexico. Potash nourishes the soil and helps strengthen plants, increasing their resistance to disease and drought.

SUNSHINE STATE POTASH
PRODUCT OF NEW MEXICO U.S.A.

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HIGRADE MURIATE OF POTASH
62/63% K_2O
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MANURE SALTS 20% K_2O MIN.

UNITED STATES POTASH COMPANY, ***Incorporated,*** **30 Rockefeller Plaza, New York 20, N. Y.**

farm chemicals facts

. . . Briefly Noted

New manager of the Mississippi Valley Fertilizer company is **J. Roy Pratt Jr.,** formerly with Ashcraft-Wilkinson company. The Mississippi plant is located at Greenville.

The best in **lined chemical equipment** is available from the Southern Lead Burning company, Atlanta, Ga., the company claims.

The company says it now is equipped to line with **Polyethylene** all types of tanks and processing equipment. The material is used in the handling of sulfuric, nitric, muriatic and hydrofluoric acids as well as many other chemicals.

Second highest tonnage of **agricultural limestone** was used by farmers in 1950, according to a report from the National Agricultural Limestone Association, of Washington, D. C. More than 1,000 agricultural limestone producers, the extension services of the 48 states and all production and marketing state offices indicate in reports to the association that 29,842,145 tons of liming material were used in 1950. The total for 1947, 30,282,902 tons, is the only higher in the history of the country.

Agricultural Conservation Program for 1952 recently was approved by **Charles F. Brannan,** secretary of agriculture. The program is authorized by Congress and is developed in conjunction with elected community, county and state committeemen from every state. Congress provided $256,500,000 for the various conservation practices.

The **farm chemicals industry,** along with agricultural leaders, farmers and various legislative bodies has given increasing recognition to conservation of national resources during recent years.

North Carolina farmers recently gave overwhelming approval to the **"Nickels for Know-How"** proposal whereby an assessment of **five cents a ton** on feed and fertilizer sales will be used for agricultural research. By a vote of more than 8–1, the assessment was approved by over 60,000 persons who went to the polls. The referendum was authorized by the last General Assembly of the state and was conducted under the joint supervision of the North Carolina Farm Bureau, the state Grange and the Agricultural Foundation of North Carolina State College.

The fee will be collected from manufacturers by the State Department of Agriculture and turned over to the Agricultural Foundation to supplement state and federal appropriations for agricultural research.

Douglas C. Newman recently was appointed general director of all sales activities of duPont's Organic Chemicals Department. Newman formerly was sales director of the dyestuffs division of the company.

Other personnel changes included the following: **Dr. Miles A. Dahlen** was named director of sales, dyestuffs division; **Gordon M. Markle,** director of sales of the fine chemicals division; **H. J. Swezey,** director of sales of the export division, and **J. Preston Wills,** manager of export sales. The export business of the entire department now is put in one sales division.

In a paragraph on page 20 of the October issue of Farm Chemicals, in the article **"Chemistry of Ammoniated Superphosphate,"** by Joe C. Sharp and Gordon A. Crowe, the following sentence appears: This product lost 2 per cent available P_2O_5 in four months at 25° to 30° C. whereas a corresponding 5 per cent N product ammoniated at 90° to 100° C. lost only 9.2 per cent P_2O_5." **The 9.2 per cent should read 0.2 per cent.**

In case further opposition to the theory that pesticides are responsible for mysterious diseases is needed (and recent scare headlines indicate it is), the **National Research Council** recently denounced the idea as completely lacking in facts. For a summary of the council's statement, read the industrial news article on the subject.

A unit for **recovering sulfur** from waste refinery gases will be added to the Houston plant of the Shell Chemical Corporation. Output of the new unit will be sold for conversion to sulfuric acid.

The new unit will be built by the Ralph M. Parsons company, of Los Angeles. It has been certified by the government as a necessary defense project.

In the recovery process, waste refinery gases, containing hydrogen sulfide, carbon dioxide and a small percentage of light hydro-carbons, will be burned and catalytically converted to sulfur at a yearly rate of 13,000 tons.

A reader in Japan calls attention to a typographical error in the article "Phosphorus," by Vincent Sauchelli, of Davison Chemical Corporation, which appeared in the August issue of **Farm Chemicals.** According to a statement in the article, "5,700,000 million tons of phosphoric acid were marketed in all countries for agricultural purposes in 1949." The word "million" should not have appeared.

Paul W. Hiller recently was appointed New York district manager of chemical sales for the Potash Division, International Minerals & Chemical Corporation. **George W. Savitz** continues as district manager of agricultural potash sales for the Division.

wonderful way to fix NITROGEN

Put it on rice! Fed to either soil or water, nitrogen helps produce vigorous rice plants, strong stalks, firm, full grains, and a greater yield per acre. In fact, no other single plant food is so vital to the growth of rice. No other element is as important in bringing in the harvest—in helping to fill the world's empty stomachs.

Of all the sources of nitrogen, anhydrous ammonia is the most concentrated and the most economical. It is this basic form plus nitrogen solutions that CSC produces at its Sterlington plant in Louisiana. Most of CSC's production is used to increase the crop yields of Gulf Coast farming land.

CSC

AGRICULTURAL DIVISION

COMMERCIAL SOLVENTS CORPORATION

No Rose Colored Glasses

The battle between the "organic farmers" and those who believe that commercial fertilizers and pesticides are necessary for the advancement of agriculture goes on.

Arguments still are being advanced by the "organic farmers" that the use of farm chemicals will poison the soil, damage the health of livestock and humans and weaken plants so they are susceptible to disease.

Products of the farm chemicals industry still are being blamed for mysterious illnesses for which medical science as yet has found no other cause.

There has been no scientific evidence advanced to support the contentions of the organic farmers. But they continue to beat the drum and declare that "the natural way is the best."

There has been, however, much scientific evidence to the contrary. E. Truog, of the Department of Soils, University of Wisconsin, pointed out in the recent winter issue of *American Cyanagrams* that "many careful experiments have demonstrated that the main benefit derived from applying organic materials to soils, such as animal and green manure, comes from the fertility elements—nitrogen, phosphorus, potassium and others—which they carry."

However violent the argument may rage, it pales when statistics on the consumption, and expected consumption, of farm chemicals, are noted.

The world-wide demand for commercial fertilizers continues to increase, the organic followers notwithstanding.

That fact comes from the Agriculture Division of the Food and Agriculture Organization of the United Nations.

In its recently issued "World Report on Production and Consumption of Fertilizers," the group states that estimated world production and consumption (excluding the USSR) of nitrogen, phosphoric acid, and potash for the year ending June 30, 1951, reached record totals.

"In some important respects," the report continues, "estimated production for 1951–52 may be out of line in comparison to former years, between phosphoric acid on the one hand, and nitrogen and potash on the other. Thus problems may arise concerning the efficient utilization of the fertilizers available. Estimates for the year ahead now are much more difficult to make, due primarily to uncertainties created by two causes: the greater industrial demand for some materials used in the manufacture of commercial fertilizers, such as nitrogen and sulfuric acid; and the world shortage of elemental sulfur, which is severe."

Thus, the problem facing the agricultural industry as it goes into a new year is not whether or not farm chemicals are valuable and necessary to a continually expanding economy—record use of the materials shows plainly that there are—but how more of these chemicals can be produced to meet increased demand. And all this in the face of vital shortages of the materials with which they are made.

The outlook for 1952 is not bright. The shortage of sulfur has been noticed for many months. There is not much hope that the picture will brighten in the near future.

Even with increased production of nitrogen, Earl Willis, sales manager of the Pacific Coast District, the Barrett Division, reports, there could be a definite world shortage of nitrogen during the present fertilizer year.

An easing in the supply of some chemicals, chlorine for instance, has been predicted for the new year, but other shortages will put a severe cramp in production.

Shortages of metals for construction and equipment will plague the industry and the production of superphosphate may decline 10 per cent, because of demands for sulfur and sulfuric acid by defense industries.

Although the production of agricultural chemicals has more than doubled in the past 10 years, there probably won't be enough to go around in 1952.

What can the farm chemicals industry do to combat these shortages?

1. It can continue to use all available economies in production so that the highest possible production is obtained from the limited resources.

2. Through the use of alternates in chemicals, the job of protecting crops against insects and disease can be aided, Paul Mayfield, assistant general manager of Hercules Powder Company's naval stores department advised recently.

3. In attempting to combat the sulfur shortage, which hinders manufacturers of fertilizers and pesticides, the industry may profit by considering the French experience during and since World War II in the field of economizing sulfuric acid for fertilizer. The job of American industry is expressed boldly in an article describing the French activities which appears in this issue.

—HAMILTON C. CARSON

Air view showing dryers and rock storage at Pierce, Florida, headquarters of A.A.C. phosphate mining operations. (Top) Sample of Florida Pebble Phosphate Rock, source of phosphorus widely used in the chemical industries, in its elemental form as well as in phosphoric acid, phosphates and phosphorus compounds. Q This pebble rock is also the principal source of the most important—and most generally deficient—plant food element. Often called the Key to Life, phosphorus is essential in maintaining and improving crop yields. Health, growth, life itself, would be impossible without phosphorus . . . so in a way these phosphate pebbles are more precious than gold.

AA Quality...

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principal AA QUALITY products

All grades of Florida Pebble Phosphate Rock — AA QUALITY Ground Phosphate Rock
All grades of Complete Fertilizers — Superphosphate
Gelatin — Bone Products — Salt Cake — Ammonium Carbonate
Sulphuric Acid — Fluosilicates — Insecticides and Fungicides
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31 FACTORIES AND SALES OFFICES, SERVING U.S., CANADA AND CUBA—ASSURE DEPENDABLE SERVICE

farm chemicals outlook

Report from Washington
by Fred Bailey & Don Lerch

There's trouble ahead in agriculture. It is coming on a number of fronts including supply, price, and manpower. Washington is becoming more aware that words do not produce food.

Watch out for those shifts in Washington and "on the farm" which may affect your business. Both are likely to change without much warning. Officials here know they are up against one of their toughest assignments . . . calling for another year of full farm production with the knowledge that production costs are rising and farm prices are trapped under ceilings.

For quick appraisal of trends, keep an eye on leading farmers and growers. It is becoming more apparent that Washington is following, rather than leading farmers on many key issues and decisions. The Department is bogged down in a running battle with mobilization agencies, sharp division over some phases of the "family farm review," and the usual activity to be expected in an election year.

The eyes and ears of your reliable fieldmen may be of top importance in planning your spring business. They may be the first to know how close farmers will come to following USDA crop goals and agronomic suggestions.

Here's the general policy of the Department for 1952. All-out production of feed grains. A feed famine is not looked for, but at the present rate of feeding, reserves will be cut almost in half before another corn crop is harvested. So, the pressure is on to get 90 million acres of corn next year. USDA will do almost everything but recommend plowing up pasture to get that acreage.

Washington planners are aiming at another cotton crop equal in acreage to 1951, but with hope for higher yield and quality.

Major obstacle to these and other high-level goals is the farm labor shortage rapidly reaching the critical stage. The farm labor force decreased by an estimated million this year . . . about 5 per cent. This rate will likely increase as the needs of industry and the armed forces grow.

Chemical industry will continue at the head of Washington's second table for most of the year, according to many officials. Iron, steel, aluminum and power expansion are expected to hold top billing until the third and probably the fourth quarter of the year. This assumes the war does not become hotter . . . and crippling strikes are avoided.

You'll hear more official talk about the U. S. as a "have-not nation." Some mobilizers privately admit they may be forced to make drastic reappraisals of our ability to produce within existing framework on imports of critical materials such as copper, lead, and nickel.

All this has a direct bearing on how much steel and other materials you will have to expand plant capacity and increase production. There is every indication that Washington will frown on cutting the "butter" from the guns in the mobilization program.

Most Department officials are thoroughly dissatisfied with the division in authority over the nitrogen program. It is likely they will continue their fight to

break the DPA-NPA hold over the program. Main worry is that the mobilizers will fail to cut through the bottlenecks in time to meet the impact of a population expanding at the rate of 2 million persons a year.

Secretary Brannan's reference to the "fifth plate," sets the theme for the Department's expansion program for industry. Gist of his theme is that by 1975 we will have five dinner plates to fill for every four we have today. He is establishing the basis for a tremendous program of study and evaluation of our resources, both farm and supporting industry.

This is the master blueprint behind the sizeable increases in nitrogen and other facilities privately discussed at top-level meetings. The potential of this approach seems almost limitless. There will be bold action on this front in the months ahead . . . the fertilizer and insecticide industries are likely to be a part of it.

Ask the DPA secretaries if you have any questions about the sulfur order. They claim to have recut the stencils often enough from the World Series to the Rose Bowl to cite section, paragraph, and line. Washington hears the fertilizer industry is producing superphosphate in spite of the delays and uncertainty and will put a distribution system into operation to spread supplies equitably.

Some officials feel it would take radio-active sulfur and a geiger counter to follow sulfuric acid through to all its end uses. Problem appears to be no nearer to solution than it was in World War II.

A new approach to insect control may be in the making. Fear that resistance of insects to the newer insecticides may spread is providing the stimulus for new planning.

Army reports of resistance of Korean flies and lice to DDT and other control materials has touched off a series of meetings calling for intensified research on the physiology of insect control. Need for basic research is being stressed.

Increased activity in the agricultural field is expected, although the greatest urgency is centered on the medical aspects of the problem. The Army doesn't want to be caught in disease-ridden lands without potent insect killers.

Some USDA entomologists believe any new research program would splash over into their field. Long histories of agricultural pest control may be a starting point to find out how and why resistance occurs. They are frank to admit concern over the possibilities of resistance to the chlorinated-hydrocarbons by some of the farmers' worst insect enemies.

Value of industry's research program also is spotlighted . . . dramatically shows the need for the continuous development of new materials.

Legislation for tighter insecticide laws is expected to be introduced in spite of the National Research Council's pat on the back to the industry. Council's report does not slam the door on the need for stricter laws, but it does laud the program of industry for research and testing of its products. It is probable that supporters of the Food and Drug position for new laws will be called on to answer the Council's statement.

Industry may support a move to shift the establishment of residue tolerances from the Food and Drug Administration to the Public Health Service. Food and Drug would be limited to policing of the tolerances. We will keep you advised.

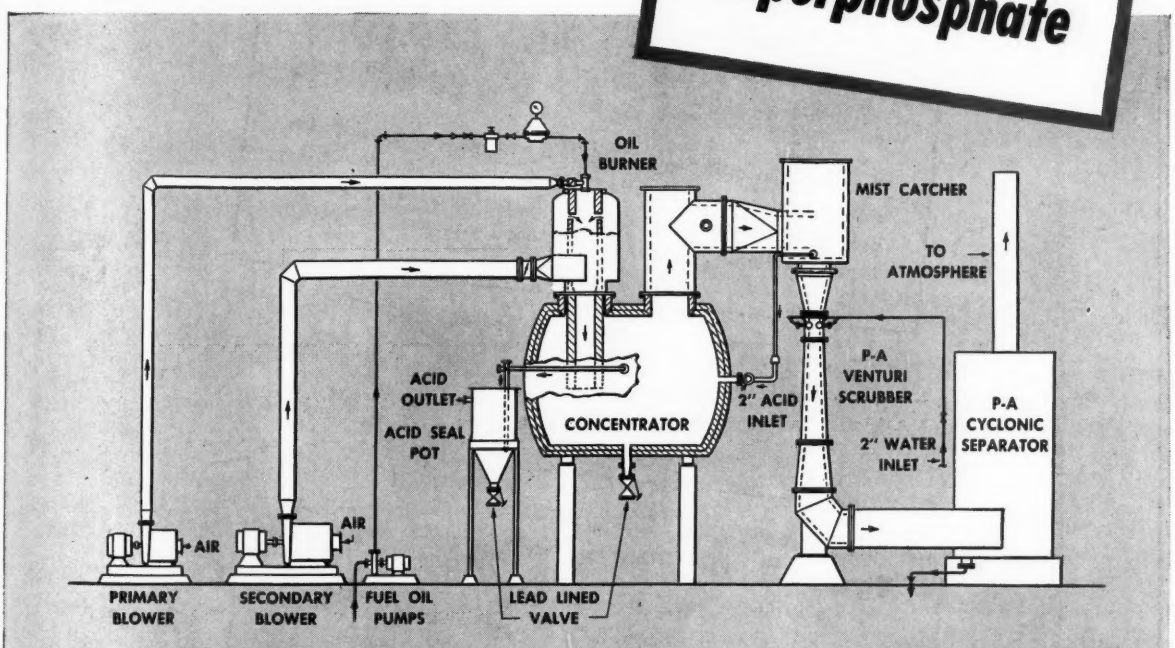
USDA would retain its authority over determination of insecticide use. Such a move would remove cause for the charge that Food and Drug acts as "prosecutor, judge and jury."

Proposal is strongly advocated by the Washington growers and shippers, most of whom favor a delegation of more responsibility to the Public Health Service . . . less authority for Food and Drug.

This could become a major factor in hearings on proposed legislation.

CHEMICO
High Temperature Concentrator

FOR EFFICIENT PRODUCTION OF *Triple Superphosphate*

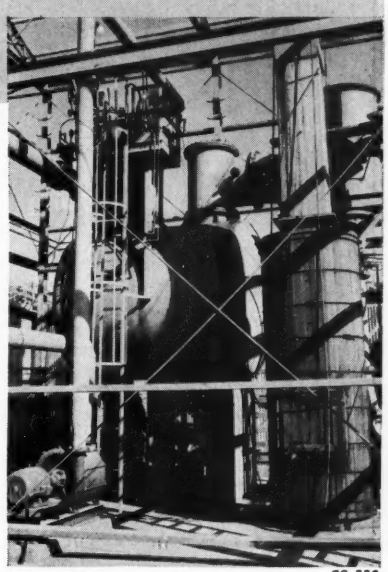


This new Chemico High Temperature Concentrator at the Gates Bros., Inc., Wendell, Idaho plant has a daily output of 60 tons of 50 per cent phosphoric acid per day, calculated as P_2O_5.

The Chemico phosphoric acid concentrator is especially adapted for the production of high strength phosphoric acid and triple superphosphate. It offers two major advantages. (1) It uses combustion gas at 2500F which accounts for its high heat efficiency (90+%). (2) It produces a very small volume of gas to be scrubbed at the concentrator exit.

Here's how it works: Hot combustion gas is released under the surface of the acid where it gives up most of its heat and emerges at a temperature slightly above that of the acid itself. The combustion of the fuel takes place in a dip pipe, specially designed to withstand high temperature on the inside and the corrosive action of the acid on the outside. Exit gases pass through a Pease-Anthony Venturi Scrubber which eliminates acid mist with 99+% efficiency.

If you are thinking of producing triple superphosphate or phosphoric acid by the wet process, it will pay you to ask Chemico for specific recommendations.



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Outlook for '52

THE world-wide demand for agricultural chemicals continues to increase, but shortages of vital chemicals continue and possibility of remedying the situation with expansion of plant facilities is hindered by the unavailability of necessary metals.

That, briefly, is the outlook for the farm chemicals industry for 1952. With agricultural personnel all over the world becoming more aware every year of the value of commercial fertilizers and pesticides, a critical shortage has set in.

Causes for the shortage are various. In the case of sulfur, for instance, sources of elemental material are petering out. A sulfur shortage, in turn, effects the phosphate fertilizer situation. Added to these factors is the military situation which demands more and more sulfur, steel, copper and other materials that play such a big part in the production of fertilizers and pesticides.

In reviewing prospects for 1952, the Food and Agriculture Organization of the United Nations has this to say about the world outlook for commercial fertilizers:

"Given a continuation of normal conditions under which a farmer can purchase fertilizers, all available data indicate that the world supply of commercial fertilizers may not meet the effective demand, particularly in some countries and for some materials. The major problem may well be that of maintaining an adequate and balanced supply of fertilizers and to make the best possible use of the supply available."

For the United States, the organization says, "It is estimated that the total production of nitrogen will increase slightly and the production of potash will also increase possibly by a little more.

"On the other hand the total production of superphosphate will in all probability be lower. It is difficult to estimate to what extent the production of superphosphate may decline. It is evident, however, that, if present raw material supply conditions continue, the total production of superphosphate will be substantially less."

A brighter note on the supply situation for 1952 recently was sounded by Paul Mayfield, assistant general manager of Hercules Powder Company's Naval Stores Department.

"The current supply situation indicates that agricultural chemicals will be available in sufficient quantity to protect the nation's crops in 1952," he declared.

Mayfield, vice president of the National Agricultural Chemicals Association, added, "Don't get the idea that farmers will be able to get all the pesticides they might want to use. There will not be as wide a choice of products as might be desired, but with the use of alternates again, the situation is encouraging for crop protection."

He estimated the 1952 requirements for chlorinated insecticides at 345,000,000 pounds. An estimated 265,000,000 pounds would be needed for domestic use, and 80,000,000 pounds for export, he stated.

Mayfield added that "Agricultural chemicals are, of course, vital weapons in these critical times. Yet American agriculture, great and still growing as its needs are, is not the only reason for the increasing production of pesticides. The military services, public health programs, and exports to friendly nations seeking to boost agricultural production and to control insect-borne diseases, also account for a large share."

The importance of sulfur to the industry was set forth recently by Vincent Sauchelli, director of agricultural research, Davison Chemical Corporation.

"It should be apparent," he said, "that when the fertilizer industry, which normally consumes about 35 per cent of the country's total sulfur consumption, has its sulfur supply reduced, the production of mixed fertilizer supplies for American agriculture suffers a corresponding reduction."

On the following pages, FARM CHEMICALS presents an outlook for agricultural chemicals in 1952.

Fertilizer, Pesticide Outlook

SULFUR ...producers tell NPA their output in 1952 will not exceed five million tons...tight supplies continue at year's end...NPA issues orders cutting consumption of sulfur and sulfuric acid by 10 per cent...sulfur holds key to the commercial fertilizer supply situation.

In brief, that's the outlook for sulfur for 1952. Production will be off slightly, demand will be greater, resulting in hardships for the farm chemicals industry. What's the reason for the desperate situation? Ralph Waltz, of Wilson & George Meyer and Company, said recently:

"The answer is simple enough. The main source of supply is a mining operation and these deposits are just petering out. At the same time, the industrial uses for sulfur are increasing. It's used not only for many agricultural products, but also for explosives, newsprint, rayon, rubber and aviation gasoline. Even though production is two and one-half times the 1939 production, the industry just can't keep up. Besides our own heavy demands, we export nearly 25 per cent of our total production, about as much as the entire fertilizer industry uses."

To combat the serious shortage, the industry is doing several things: 1. Searching for new brimstone deposits. 2. Constructing facilities for manufacturing sulfuric acid from pyrites. 3. Considering use of natural gas, petroleum refining gas and smelter gas to produce the substance.

Virginia dairy farmers load hopper in cockpit of plane which will spread pelleted fertilizer over pastureland to increase fertility and aid grass.

—Photo by U.S.D.A.

World demand for elemental sulfur is estimated to be 6,100,000 tons, while the estimated world supply is 5,570,000 tons.

One aid to the industry was the recent issuing of limitation orders for sulfur and sulfuric acid. Now, at least, formulators and mixers of chemicals know how much sulfur and sulfuric acid they may use in 1952, even if they don't know where to get it all.

In trying to combat the problem by construction or new plant facilities for the manufacture of sulfur from pyrites and similar substances, industrial leaders again are stymied. They just won't be able to get enough of the necessary materials for construction of the plants.

Economical and efficient use of sulfur seems to be the only certain help for users of the element in the farm chemicals field.

Under the recently released limitation orders, use of sulfur is restricted to 90 per cent of that used in the calendar year 1950. The order applies on a company rather than a plant basis.

Sulfuric acid producers must maintain the same ratio between sales and captive use of their total production of sulfuric acid which they established by actual distribution in the calendar year 1950.

PESTICIDE prices generally will continue at the same level in 1952, according to the United States Department of Agriculture. Some pesticides rose sharply in price at the beginning of 1951. These are expected to continue at the high level. Supply outlook for pesticides for the year appears good, because of big increase in production during 1951. Benzene and chlorine, important for manufacture of DDT, BHC, methoxychlor, toxaphene, 2,4-D and other pesticides, apparently will be adequate for the year.

BHC supplies are expected to be adequate in 1952. NPA announced recently it has agreed with its Benzene Hexachloride Industry Advisory Committee that approximately 120 million pounds of technical BHC will be needed during the year and that the industry has adequate facilities to produce the required amount. The Office of International Trade is permitting nearly all export needs to be filled except for dusting powders requiring considerable use of sulfur. New production facilities in the industry should ease condition for BHC in the new year.

for '52

Importance of anhydrous ammonia as a plant food has grown in the past few years. Here a farmer applies it with a John Blue Co. applicator.

PHOSPHATE supply will be short. Predicted shortage is 300,000 tons of phosphoric acid in all forms of phosphatic fertilizers for the world market. Estimated production for the season is 5,350,000 tons as compared to last season's 5,650,000 tons. Superphosphate accounts for nearly all of the phosphoric acid in the United States. Supply will be approximately 15 per cent down from last season, with an estimated 15 per cent increase in demand predicted, hence a 30 per cent shortage. Dwindling supplies of sulfur naturally have aggravated the problem. Phosphate rock seems to be in adequate supply, but sulfuric acid is drastically short.

SUPER-PHOSPHATE will continue to be scarce in 1952. Long-term outlook for the material is more favorable, but the pinch will really be on during this year. Manufacturers probably will be able to meet only 80 per cent of demands. Production may be helped by two things: 1. Making phosphates from elemental phosphorus; 2. Obtaining more sulfur. Of course, these don't hold much hope. The former isn't commercially feasible yet and the continuing shortage cripples the second. Allocation of sulfur by NPA will be the determining factor in production of super during the year. Regional problems have been caused by two factors: 1. Sulfuric acid shortage; 2. Increase in demand for phosphate fertilizer. There may be an increase in triple super because the Atomic Energy Commission wants the uranium byproduct of phosphoric acid manufacture.

Proposals to acidulate by substitute methods, such as using nitric acid or nitric mixed with sulfuric probably won't be used extensively during the year.

HERBICIDE and defoliant chemicals are expected to be in sufficient supply. The NPA thinks demand for the chemicals will increase during the year but that production will keep pace. Requirements and probable supply, respectively, for sodium arsenate are 5,000,000 and 5,600,000; for sodium chlorate, 30,000,000 and 40,000,000; and for 2,4-D acid, 29,500,000 and 29,000,000.

FERTILIZER consumption probably will reach an all-time high in 1952, judging by the record set in 1951. J. E. Totman, chairman of the board of directors of the National Fertilizer Association said recently consumption for the fiscal year ended June 30, 1951 probably would total 19,000,000 and that the outlook for the new year indicates a half-million more tons will be consumed. But increased demand for plant foods probably will cause a shortage. A continuing demand for fertilizer from year to year is predicted by Totman. The requirements for more and more food for domestic use and for export to our forces overseas, and to our allies, can be met only by greater use of plant food, he declared. But because two of the basic materials of the fertilizer industry—nitrogen and sulfuric acid—are essential in munitions production, the situation is further hampered. Totman urges industry members to use liquid nitrogen in place of the solid forms whenever possible to save the material.

SULFURIC ACID will be scarce in 1952 because of the serious shortage of sulfur. The scarcity of sulfuric acid, in turn, will hinder the production of superphosphate. A shortage of construction materials makes any expansion of plant facilities almost impossible. Such programs as manufacturing sulfuric acid from gypsum or pyrites are costly and could not be successful unless building materials became more plentiful. Some leaders have proposed that acidulation be done with nitric acid or mixtures of nitric acid with sulfuric acid but this, too, is viewed as impractical.

Increased and diversified use of agricultural chemicals is illustrated in this picture of a DC-3 spraying a grasslands range for grasshopper control.

—Photo by U.S.D.A.

Fertilizer,

LEAD shortage will continue to plague manufacturers of insecticides. Shortage of primary soft lead looks like it will get worse in '52 rather than better. Supplies continue scarce with normal requirements more than double the amount available for allocation. Lead Consumers Industry Advisory Committee recently named the following as causes for the severe drop in supply: 1. Loss of imports caused by current price limitations which place domestic consumers at a disadvantage in competing for lead on the world market. 2. Rising rate of consumption. 3. Labor shortages in certain mining areas and 4. Declining production at the mines because of higher production costs. Arrangements were made with the Canadian government under which the ceiling price for imported lead was raised from 17 cents to 19 cents a pound. Industry leaders say this plan hasn't improved the situation by increasing imports. The advisory committee has recommended that NPA request sufficient tonnage of lead be withdrawn from stockpile to make up for loss of imports and work stoppages.

BAGGING outlook still is anything but bright, despite increase in production in packaging industry. Shortage of metals puts added pressure on other types of containers. OPS has a nearly complete set of tailored price regulations for the paper industry after recent regulations. Burlap problem has been most acute. One bright spot is seen in agreement by Indian Jute Mills Association to increase work week and reduce export duty on burlap. Improvement in the general packaging situation is seen for the distant future. Expansion in the industry included the recent completion by Bemis of a new multiwall plant at Peoria, Ill. Increase in jute production in Pakistan for the coming months also has been reported.

CHLORINE supply situation looks better for the first quarter of '52. NPA thinks great expansion in the industry will take place during the year. Present production of chlorine was estimated by NPA at 6,550 tons a day. New facilities should help the situation. Solvay will expand its Hopewell, Va., plant to get an additional 28 tons a day without producing caustic. Capacity of Diamond Alkali Company's Houston plant for producing the chemical is scheduled to be upped to 400 tons a day after a $5.5 million expansion program. Mathieson Alabama Chemical Corporation, subsidiary of Mathieson Chemical Corporation, has a $10 million plant under construction for the manufacture of the chemical. In addition, a new oxidation process for the manufacture of ethylene oxide and glycol promises to help alleviate the chlorine shortage. According to NPA, need for chlorine in 1953 will be approximately 3,640,000 tons. That means an expansion during the year of 1,500,000 is necessary. Shortage of metals for construction limits plant expansion, thus adding to the problem.

TANK CAR shortage may cause serious trouble for the farm chemicals industry during the year. Chemical production is expected generally to be up considerably during 1952, but the hitch may come when the chemicals can't be shipped. Deliveries of tank cars in the first 10 months of '51 were only about half the productive capacity of 900 cars monthly. Things probably will go from bad to worse during the year as old cars become unserviceable and it becomes increasingly difficult to get the materials to build new ones. Another factor that darkens the outlook is the labor problem. Freight car industry reports that many workers left their plants in '51 after car production was cut back. Even if steel is made available for an increased production of the cars, it may be difficult to induce workers to come back from defense plants to do the job. Allotments of controlled materials for the first quarter will permit construction of 2,000 domestic tank cars, a reduction of 500 from the last quarter of '51. One group, the National Industrial Traffic League, goes so far as to predict a breakdown of the nation's rail transportation services by mid-year. Other leaders, however, are less pessimistic.

Pesticide Outlook for '52

NITROGEN is a big problem in 1952. There could be a world shortage of the chemical during the present fertilizer year, Earl Willis, sales manager of the Barrett Division, said recently. World production of nitrogen has been on the increase since 1948–49, the Food and Agricultural Organization of the United Nations reports. From 3,310,000 metric tons produced in 1948–49, the production increased to 3,957,000 in 1950–51. The Organization estimates a production of 4,090,000 metric tons for 1951–52. Even with this increase there could be a definite world shortage of nitrogen. Official estimates see an increase of approximately eight per cent in production of nitrogen next year, over 1951. Solid forms will be about the same as last year, approximately 800,000 tons. Liquid forms, such as anhydrous ammonia, and solutions will be slightly increased to approximately 550,000 tons. Morgantown probably will resume production of the chemical but probably not in time to produce more than 60,000 tons of nitrogen. An increase of between 400,000—500,000 tons will be available from production facilities already approved. But most of this will not be available during '52, and the continuing shortage of necessary metals for construction will cause further delay.

All in all, it now looks like there will be about as much nitrogen available for this fertilizer year as for the last one. This probably won't be enough to go around, however, and some hardships will result. On the long range view, nitrogen production is expected to increase by 600,000 metric tons by 1953–54, according to the London brokerage firm of Aikman, Ltd. The firm estimates increases of 150,000 in 1951–52, 200,000 tons in 1952–53 and 250,000 tons in the 1953–54 season. The increase in consumption of the element in the United States has been a prominent factor in the tightening supply situation. World stocks of nitrogen are expected to be reduced to approximately 250,000 tons by June 30, 1952, according to Aikman's.

J. E. Totman recently said "there is no apparent serious shortage ahead for nitrogen. In fact, the planting season of 1951—1952 should have obtainable more nitrogen than the previous year. It will not all be just where manufacturers of fertilizer want it, nor will it be in the forms we prefer."

"Solid forms of nitrogen will be scarce; the increase will be in liquid forms," Totman added.

L. G. Porter, chief of the fertilizer staff, Production and Marketing Administration, USDA, stated recently that nitrogen production will have to be increased at the rate of 100,000 tons a year to keep abreast of population increases.

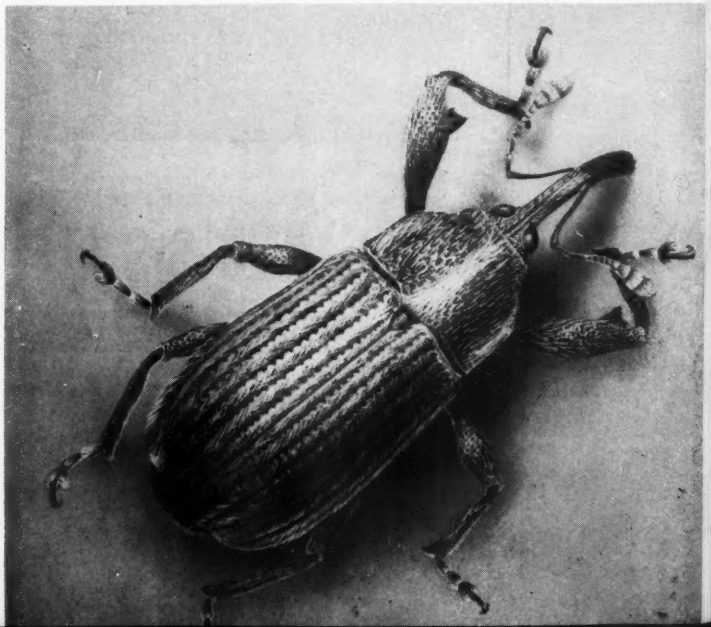
STEEL is highly unpredictable. Outlook for first quarter of new year is fairly good but after that no one can predict. The Defense Production Authority recently announced first quarter structural steel allocations will be large enough to meet the full requirements of the steel and aluminum expansion programs. The decision on steel is a big change from the last quarter of 1951 in which the steel expansion program received only 51 per cent of its stated requirements. The Agriculture Department fared poorly in the fourth quarter, getting only 4,000 tons of steel, or 8.7 per cent of the 45,962 tons it asked for.

The Steel Products Industry Advisory Committee has been meeting with the National Production Authority in an attempt to iron out the problems connected with the steel shortage. Such subjects as the problem of how to increase the use of high-cost conversion steel, proposed changes in the schedule under which mills must open their order books at specific times in advance of a quarter and scarcity of structural steel are being considered by the two groups. Allotments of steel for civilian goods manufacture in the first quarter have been made. Shifting of more steel into direct military use is expected for later in the year. Labor troubles have been plaguing the steel industry and a large-scale walkout would serve to aggravate the shortage problem.

Recent postponement of the scheduled strike came as a pleasant surprise to all industries but possibility still exists for a steel strike in the spring. ◆

The life expectancy of this boll weevil isn't very long these days with the development of modern pesticides that make the farmer's job easier.

—Photo by Hercules Powder Co



French Save Sulfur

by producing 'complex' fertilizers containing NPK obtained directly by reaction from basic raw materials

By M. Massenet

Paper presented at Technical Meetings in Paris, September 25 and 27, 1951

This paper discusses the French experience during and since World War II in the field of economizing sulfuric acid for fertilizer production.

The average consumption of sulfur throughout the world for the period 1935–1939 was about eight million long tons, of which 4,350,000 tons was from pyrites, 2,175,000 from American crude sulfur and the remainder from other sources. In 1950 the world consumed about 11,500,000 tons of sulfur, i.e., an increase of some 40 per cent in 10 years.

It can be assumed that approximately 75 per cent of the world consumption of sulfur in all forms is for the production of sulfuric acid and that approximately 35 to 40 per cent of the world sulfur consumption is in fact used to manufacture superphosphate and sulfate of ammonia.

In France the "Plan" authorities stated in 1947 that it was expected that the consumption of soluble phosphoric acid from raw phosphate would rise from 191,800 tons in 1946–47 to 560,000 tons at the end of the "Plan."

It would seem that for the O.E.C.E. countries and the USA alone sulfur requirements are increasing at the rate of a million tons a year.

The sulfur shortage already is acute and it does not seem possible that the increasing needs can be met at the current price level. It is imperative to study means of economizing sulfuric acid in the production of fertilizers.

French experience in 1940–45 can be studied with advantage because during that period her shortage was even more acute than the present world shortage.

Sulfur imports fell to practically nothing during the war years and sulfuric acid was produced solely from French pyrites and existing stocks.

The entire chemical industry was effected, especially the production of superphosphate and sulfate of ammonia. It can be said that in 1944, the fifth war year, these industries were dead.

Every effort was made to economize acid and to develop the relatively poor national resources of sulfur and pyrites and to use other raw materials.

It did not prove practicable sub-

FERTILIZER CONSUMPTION IN THE UNITED STATES

	Average consumption 1935-39	Estimated consumption 1949-50	Estimated requirements 1950-51	Anticipated requirements 1959-60
Nitrogen	371	1,030	1,350	2,200
Soluble Phosphoric acid (P_2O_5)	719	2,060	2,300	3,600

Under the French technique, less sulfur would be needed for the production of superphosphate. Farmers, like those shown preparing to spread superphosphate on the Rolfe Lee farm, Mason County, W. Va., would be able to obtain more of the material if the sulfur shortage were alleviated.

stantially to increase the 1939 figure of pyrites extraction, 86,000 tons, and indeed the average for the war years was only about 87,000 tons of sulfur.

Blende deposits (native sulfide of lime) are limited and extraction could only be increased from 40 tons of sulfur in 1938 to 3,500 tons in 1947, and finally, 7,500 tons in 1950.

Native sulfur is almost non-existent, but the Narbonne deposit was exploited, and production from this source is expected only to reach a level of some 20,000 tons of sulfur for the year 1951–52.

Gas Recovery

Recovery of gases brought in only approximately 2,500 tons per annum for 1949 and 1950.

Gypsum produced some 5,000 tons of sulfur in 1949 and 10,000 tons in 1950. However gypsum can be used also for the direct production of sulfate of ammonia. It replaced some 17,000 tons of sulfur per annum in 1938 and as much as 26,000 tons in 1949.

French requirements of sulfur in all forms amount to approximately 750,000 tons per annum today.

In 1938, of a total French consumption of 572,000 tons, 308,000 tons of sulfur were used to produce fertilizers, of which 190,000 tons were for phosphatic fertilizers, 90,000 tons for sulfate of ammonia, 7,000 tons for sulfate of potash and 21,000 tons for sulfate of ammonia direct from gypsum.

If applied to Germany, the direct treatment of magnesium sulfate with muriate of potash for the production of sulfate of potash must be added to this plan.

Fixing Agent

When producing superphosphate or triple super, sulfuric acid has the effect of fixing as sulfate of lime that portion of lime contained in the raw phosphate which exceeds one molecule per molecule P_2O_5.

Thus the carbonate of lime contained in the rock and two-thirds of the lime, which is in the form of tri-calcium phosphate, are fixed as the sulfate and there remains the monocalcium phosphate, the P_2O_5 content of which is soluble in water. This involves in France the consumption of 2.3 tons of 100 per cent sulfuric acid per ton of solubilised P_2O_5—approximately 0.85 tons of sulfur.

In the production of sulfate of ammonia the technical role of the sulfuric acid is simply to support the nitrogen. This involves 3.5 tons of 100 per cent sulfuric acid to one ton of N., or 1.35 tons of sulfur.

Finally, in producing sulfate of potash, the sulfuric acid frees hydrochloric acid, which can be used to produce di-calcium phosphate. In this case the sulfuric acid has in fact a double use. This product has been manufactured in France and Belgium for 20 years and gives rise to some 30,000 tons a year of P_2O_5 in the form of precipitated di-calcium phosphate, soluble in basic citrate of ammonia. This must be considered an efficient fertilizer and this fact is a fundamental basis for considering the problem of sulfur economy.

Evolution Needed

The theoretical objectives of producing a soluble P_2O_5 fertilizer and of producing nitrogen in a form requiring less sulfuric acid than sulfate of ammonia could not be attained without a natural evolution in the technique of using fertilizers and of the requirements of agriculture.

A reduction in the use of sulfuric acid has been obtained, while the use of nitrogenous fertilizers has increased. As regards soluble P_2O_5, the tendency toward compound fertilizers helps make it possible to produce additional quantities of fertilizers, requiring less sulfuric acid.

The plan, drawn up in 1947 and 1948 by the Compound Fertilizer Sub-Commission of the "Plan" foresees that 56 per cent of French fertilizers ultimately will be in the form of compounds. In France, compounds produced by combination rather than by mixing of fertilizers also are called "Complex Fertilizers."

Since 1938–39 the proportion of N used in complex fertilizers has steadily increased and in 1948–49 accounted for about 12.2 per cent of the total N, consumed in France. The quantities of P_2O_5 and K_2O, consumed in the form of complex fertilizers, have followed the same progression. This progress however is just the start of a new industry, now being set up, the equipping of which was delayed until 1948 by the war.

In France a complex fertilizer means any fertilizer containing the three elements obtained directly by chemical reaction from the basic raw materials, such as rock phosphate, gaseous ammonia and nitric acid; also sulfuric acid and sylvinite, chloride or sulfate of potash.

Since 1920, the technique of manufacture has been the object of

considerable research, particularly in Germany, but it was really only a few years before the last war that certain types of processes, relatively simple and of practical application, were chosen.

Without endeavouring to cover all the processes developed, it can be stated that most of these belong to two principal classes: the nitric cycle and the sulfo-nitric cycle. The treatment of rock phosphate by nitric acid without the use of sulfuric acid is the first cycle.

Excess Lime

Excess lime from rock phosphate is separated in the form of nitrate of lime and one obtains, after saturation by ammonia and the addition of potash salt, two products—complex fertilizer and nitrate of lime as by-products.

The second class of process fixes the excess lime in the phosphate in the form of sulfate of lime with the use of a limited quantity of sulfuric acid. One then obtains, after addition of a potash salt, the complex fertilizer without any by-product. The sulfuric acid can play its part in this reaction, either as such or in the form of a salt, such as sulfate of ammonia or sulfate of potash.

First Cycle

The first cycle avoids the use of sulfuric acid and the fertilizers obtained contain approximately equal quantities of nitrogen and phosphoric acid, so that the quantity of soluble phosphoric acid obtained is in proportion to the quantity of nitrogen available to the manufacturer.

Practically speaking, in the sulfo-nitric cycle one obtains about 1 kg of soluble phosphoric acid for 1 kg of nitrogen and 1 kg of sulfuric acid. The phosphoric acid is obtained in the form of di-calcium phosphate and gives an economy of more than 50 per cent in the sulfuric acid, which would be required to solubilize the P_2O_5 in making superphosphate.

In the nitric cycle one frequently finds two-thirds of the nitrogen in the complex fertilizer and one-third in the by-product nitrate of lime.

In both cycles fixation of nitrogen does not require sulfuric acid.

From the point of view of economy it is interesting to consider whether the reduction in consumption of sulfuric acid of more than 50 per cent, obtained in the sulfo-nitric cycle for the solubilization of the P_2O_5 is sufficient, in view of the sulfur shortage, and to compare it in this connection with the application of the nitric cycle.

Nitrogen Production

The nitrogen production in France is 200,000 tons N, and the production of soluble phosphoric acid is 250,000 tons, which consumes 212,500 tons of sulfur. Of the nitrogen produced, 60,000 tons are fixed in the form of sulfate of ammonia, consuming 80,000 tons of sulfur.

The total consumption of sulfur for the two fertilizers therefore is 292,500 tons.

The general application of the

CONSUMPTION OF SULFUR IN ALL FORMS

(In thousand metric tons of sulfur contained)

	Period	Crude Sulfur	Pyrites	Blendes	By-product & various	Anhydrite & gypsum	Total	Average over 3 years
17 OECE countries	48–49	916	1,882	272	142	221	3,433	
	49–50	1,025	2,015	313	148	229	3,730	
	50–51	1,160	2,358	349	166	236	4,269	3,810
USA	1949	3,477	442	...	266	...	4,185	
	1950	4,080	512	...	306	...	4,898	
	1951	4,310	510	...	438	...	5,258	4,780

World consumption increased, in round figures, from 7,500,000 to 9,500,000 tons in three years, i.e., by 1,000,000 tons in the space of one year, divided approximately in the proportion of 11 to 8 between the U.S.A. and the 17 O.E.C.E. countries.

sulfo-nitric cycle would produce 200,000 tons of soluble phosphoric acid, consuming 74,000 tons of sulfur, so that there would remain to be produced 50,000 tons of soluble phosphoric acid in the form of superphosphate, consuming 42,500 tons of sulfur. The production of sulfate of ammonia would have disappeared since the whole of the nitrogen production was in the form of complex fertilizers.

Total Consumption

The total sulfur consumption would be 74,000 + 42,500 or 116,500 tons, instead of with the old method, 292,500 tons. The total economy would be 176,000 tons of sulfur or approximately 60 per cent of the former consumption. It would furthermore be necessary to produce 100,000 tons of nitrogen in the form of nitric acid, which would appear to be within the present production capacity.

Nitric Cycle

If the nitric cycle were applied fully, it would lead to the following results:

Of the 200,000 tons of nitrogen approximately two-thirds, 132,000 tons, would be found in the form of complex fertilizers and the rest, approximately 68,000 tons, in the form of nitrate of lime. To the 132,000 tons of N in complex fertilizers would correspond 132,000 tons of soluble phosphoric acid, produced without the use of sulfuric acid. It would therefore be necessary to continue to manufacture in the form of superphosphate 250–132 or 118,000 tons of soluble phosphoric acid, consuming 100,300 tons of sulfur.

The saving in sulfur would then be 192,200 tons of 292,500 tons or 65 per cent of the former consumption. Compared with the sulfo-nitric cycle, the additional economy for the nitric cycle would correspond to only 16,200 tons, or approximately 5 per cent of the quantity of sulfur used in the old way.

It can be seen that by applying either of these cycles its full extent an approximately equal economy sulfur would be made.

This theoretical note shows clearly the importance of the effort to be made and the resulting economy in sulfur, which could be made by the development in France of the manufacture of complex fertilizers.

As regards the choice to be made between the two cycles, it depends upon the wishes of the farmer and particularly upon the desirability of producing a considerable quantity of nitrate of lime, and also upon the present equipment of the fertilizer works.

Simplicity Essential

Furthermore, the choice must be influenced by the simplicity of the apparatus and working conditions, the quality and final stability of the products obtained and the need for elasticity in manufacture to enable the formulas of the fertilizers to be varied at will.

In order to reduce this danger in the world, it must be reduced in the United States, which alone represents more than 50 per cent of the world fertilizer market and where technical skill is so developed as to allow the setting of an example.

It has been noted that the consumption of compound fertilizers is rapidly growing in France, both as regards value and expressed as percentage of fertilizer consumption (34.5 per cent to date).

It has, however, been noted that in the production of compound fertilizers, complex fertilizers are de-

Production Capacity of Nitrogenous Fertilizer Works in Per Cent

	Sulfate of ammonia	Ammonium nitrates	Complex Fertilizers	Sodium nitrate & nitrate of lime	Various	Total
Capacity 1947.....	28	32.5	11.5	24.5	3.5	100
Anticipated capacity for achievement of "Plan"	21.5	32.5	28.5	13.8	3.7	100
Variation of percentages..	—23	0	—150	—43.5	0	

Phosphatic Fertilizers

(In percentage, not including basic slag and ground phosphates)

	Superphosphate and triple super	Precipitated di-calcium phosphate	Complex Fertilizers	Total
Consumption 46–47.....	91	4.5	4.5	100
Anticipated manufacture for achievement of "Plan"....	48	2	(Capacity) 50	100

It can be seen that, in spite of the stagnant period of the war years, there is a continual progress toward the use of compound fertilizers, and that the proportion of complex fertilizers is rapidly increasing since the end of the war.

veloping very rapidly and are resulting in a considerable saving in the use of sulfur. Generally, these complex fertilizers contain an easily soluble P_2O_5 in the form of a di-calcium phosphate, which has excellent fertilizing properties.

In the United States the situation is very different; practically 80 per cent of fertilizers now are consumed in the form of compounds, but little or no complex fertilizer is made in this country.

A further important difference between French and American products is that the ratio of soluble P_2O_5 and nitrogen is about 2 in the United States to 1 in France.

If, therefore, with the object of economizing sulfuric acid and sulfur, the United States decided to tend towards the manufacture of complex fertilizers, it would be necessary that a means of producing fertilizers, containing on the average two units of P_2O_5 or more to one unit of nitrogen, should be found.

The work done in France shows that this object can easily be attained by adding, as a fourth element in the manufacturing cycle, ammoniated superphosphate or di-calcium phosphate.

The future development of complex fertilizers in the world appears to be only possible as a result of industrial liaison, similar to that which assisted the French development in this field.

Principal Producers

The six principal French producers of complex fertilizers are either among the largest manufacturers of superphosphate or di-calcium phosphate or else are among the principal producers of ammonia.

The works for the production of complex fertilizers have been set up either in old phosphatic fertilizer works, which already possessed sulfuric acid plants, or in former nitrogen works, which possessed nitric acid plants. The flow-sheets of the raw materials handled depend upon this initial choice of the location of the works.

In the first case, it has been necessary to construct alongside of the superphosphate or di-calcium phosphate works a nitric acid plant. Raw materials brought to the works are pyrites, rock phosphate, chloride or sulfate of potash and ammonia in tank cars.

In the second case, raw materials brought to the works are rock phosphate, chloride or sulfate of potash and, if necessary, sulfuric acid. If it is desired to increase the phosphoric acid content of the complex fertilizers, either ammoniated superphosphate or di-calcium phosphate may be used.

Full Application

It has been shown how the theoretical full application of the sulfo-nitric cycle to the production of complex fertilizers can, in the case of France, lead to considerable economy in the use of sulfur.

Assuming now a country which consumes a million tons of nitrogen, of which 200,000 tons is in the form of by-product sulfate of ammonia and 200,000 tons in the form of sulfate of ammonia, produced by synthesis, and which consumes 1½ million tons of soluble P_2O_5 as ordinary superphosphate, assuming furthermore that its nitric acid works are capable of producing 400,000 tons of nitrogen in the form of nitric acid, the present consumption of sulfur for fertilizers is 1,807,000 tons.

With the application of the sulfo-nitric cycle it would be necessary to retain the by-product sulfate of ammonia which is essential. There would then remain 800,000 tons of nitrogen which would solubilize 800,000 tons of P_2O_5 of the 1½ million tons to be produced. The consumption of sulfur would then become 1,157,000 tons. The total saving would therefore be 650,000 tons or 37 per cent.

A similar calculation would show that the general application of the nitric cycle would lead to a saving of 719,000 tons of sulfur or 39 per cent, but with at least 266,000 tons of nitrogen in the form of nitrate of lime.

It is not necessary to make this theoretical study to show that each time an industrial development permits of replacing a tonnage of compound fertilizers by a tonnage of complex fertilizers, containing the same quantity of fertilizing elements, an important saving of sulfuric acid is achieved.

The high proportion in any country of compound fertilizers, as compared with a total tonnage sold, would appear to be a factor facilitating the development of complex fertilizers, and consequently a considerable saving in the sulfur consumption.

This is a fundamental fact which probably will enable the principal obstacles to be overcome more easily in certain countries like the USA than in France, these obstacles being in general more due to human nature than to technical or economical factors.

A considerable part of the necessary evolution already has been started, since agriculture is used to consuming fertilizers and industry knows how to produce such fertilizers by modern methods, involving an economy in the use of sulfur.

Closer cooperation between superphosphate manufacturers who produce compound and nitrogen fertilizers will facilitate this process.

Progress Elsewhere

In conclusion, if the acute shortage of sulfur from which France suffered in the period 1939 to 1945 was one of the main causes of technical progress in this field, there appears to be no obstacle to the application of this progress elsewhere in the world.

The author believes that superphosphate and ammonia producers are primarily interested in the development of these new methods and that it is up to them to take advantage of them, and that producers as well as farmers will benefit by obtaining the quantities of fertilizer required in the desired form.

The author believes furthermore that the adoption of processes already in being on full industrial scale will save a number of years by avoiding the necessity of long preliminary work.

Faced with the seriousness of the present supply position should one not today complete the time-honoured phrase by saying "time is money and sulfur." ◆

farm chemicals safety:

Good Housekeeping

in industry can result in safer conditions and help lower costs

M. V. Wharton
Vice President
Arizona Fertilizers, Inc.

THE subject of good housekeeping in industry as a whole has generally been well covered in various articles, in trade magazines and particularly well done by bulletins from the National Safety Congress. The fertilizer industry has not had particular attention given to it, and if there is any industry that has had a reputation for poor housekeeping it certainly has been the fertilizer industry.

This is understandable because of the type of materials used and the manner of processing them. In many cases a makeshift of cheap equipment was the beginning of many of our reasonably large fertilizing companies today and because of the nature of their beginning the habit of cheap operation with cheap labor has held on.

A few of the newer and more elaborate plants have been especially designed to provide maximum safety and opportunity for easy housekeeping. It is not my object to point in criticism to any company but rather to cite a few poor housekeeping methods that in my opinion are quite costly.

1. Light. Generally speaking fertilizing plants are poorly lighted, either because of lack of windows or sufficient artificial lighting. In some instances adequate facilities are present but negligence in keeping the windows clean or bulbs replaced brings about a poor situation.

A dim and gloomy atmosphere can cause costly mistakes. Probably the greatest of these is improper weighing or improper formulation where poor visibility obscures dials or formulas.

2. Dust Control. Virtually all fertilizer materials are dusty. To control this dust in processing often is a major problem. It is easy to neglect this, and as one manufacturer remarked, "What difference does it make compared to the cost of taking care of it?"

I have seen plants where the mixing room had so much dust in the air that a lighted electric globe was barely visible for ten feet. How can labor be accurate and efficient under these conditions? How can machinery be well taken care of when covered with a heavy layer of dust and grease? How can the package that goes to the consumer be clean, neat and attractive if handled under dusty conditions?

It is impossible for machinery in these conditions to operate efficiently because dust is abrasive and naturally shortens the life of the machinery. It is impossible for management to check properly machinery and know when it is in need of repair or maintenance attention if it is dirty. I have seen plants, where, as the saying goes, "it is clean enough to eat off the floor." I have investigated their maintenance and breakdown records and find them much less than those of dirty plants. The life expectancy of machinery therefore is greater. I maintain this makes for greater savings.

3. Cleanliness. Cleanliness is another very important item in good housekeeping, particularly as it refers to safety. We all know that present insurance rates are unnecessarily high and it is believed they will be lowered if good working conditions are provided.

A floor that is covered with one or two inches of dust, spilled

chemicals and dirt is conducive to accidents. The slowdown brought about by having to work or move materials over a floor with a coating of inert material is costly in itself.

4. Orderliness. Orderliness is another very important point. In a recent experiment a crew of men put up two piles of sacks. One of them was piled in a straight and orderly manner. It did not lean to one side or the other and the bags were easily counted in inventory. The same crew was sent to the other end of the warehouse and unloaded another car of bags and threw them into the pile in a careless manner. When they had finished, the stack was leaning dangerously to one side and it was impossible to count the bags properly.

The men did not know what was going on and an accurate time was kept on the crew which put up both stacks. It took twenty minutes less time to stack fifty tons of bagged material properly than it did in a haphazard manner. We kept accurate count of how many bags were broken as these stacks were taken down and delivered to consumers' trucks. Six were broken in the orderly stacks and fifty-three in the carelessly piled material. Resacking is a costly process, as any farm chemicals manufacturer knows.

While this experiment was in process an accident happened in a competitor's plant not far away. A stack of material was carelessly set up. The workman saw a protruding sack two-thirds of the way down and remarked, "I am going to pull that sack out. The pile will fall down and we can load the truck quickly." He did, the stack fell on him and at the end of three months he is still in a cast with a broken back. Costly? I would say so—from the standpoint of injury, of the insurance rate, from the number of bags broken in turning over the stack and the time wasted in unnecessary cleaning up afterward.

Poor housekeeping breeds an atmosphere of carelessness, and carelessness breeds mistakes. Any mistake cost money.

5. Labor. It became necessary for the writer and his partner to rebuild their fertilizer and mixing plant after 15 years of operation. We did this with an idea of plenty of light, ventilation and dust control. Without increasing the salary scale we found that in a short time we were actually getting a much higher quality of labor.

In talking with these men we found that many of them were from other fertilizer plants. When asked why they made the change, invariably the remark was, "I had much rather work under clean conditions for less money." Perhaps this does not indicate lowering costs, yet we were surprised to find increased efficiency of better than 20 per cent as measured by output.

There is another thing concerned with labor that we have noticed. While a piece of machinery is new and freshly painted, it receives careful attention. As the machinery becomes older the dirt accumulates with the grease, hiding the fresh paint and it gradually receives less and less attention.

An operator of a mixing plant in California told me his program of cleaning up and repainting each slack season had very greatly reduced his repair bills. It is only human nature to have pride in something clean and orderly. Where there is pride there is going to be efficiency. Where there is efficiency there will be increased output and unit costs will be reduced correspondingly.

Good housekeeping certainly is an outstanding safety measure. Compare the working conditions with good lighting, freshly painted rooms and machinery, a clean floor with "everything in its place and a place for everything," and you have a situation in which labor will be proud to work and proud to maintain its orderliness and clean appearance. This will make for quality products, produced efficiently.

6. Pride, Morale and Esprit de Corps with a labor team. In industry these are just as important as on the football field or in a military battalion. They can only be maintained under favorable working conditions, obtained through good housekeeping.

It is a compliment to management when salesmen and fieldmen bring customers through the processing plant. When a customer sees an orderly, clean processing job being done with good labor proud of what it is doing, I believe it ties them to the company and makes them loyal boosters. This increases sales and production which in turn reduces unit cost. ◆

Brownsville, Texas Is Good Place For New Chemical Process Plants

Members of the farm chemicals industry should consider Brownsville, Tex., as the location for future construction, according to a report issued by the board of development of that city.

Brownsville needs sulfur and phosphate rock grinding plants to serve the agriculture of the area, the report states.

Raw sulfur is available from Mexico and phosphate rock is accessible from a nearby seaport, the Intracoastal canal or two U. S. railroads.

The city is the largest in the Rio Grande Valley of Texas, an area that produced 600,000 bales of cotton this year along with a big crop of oranges and grapefruit. Farmers in the area are big users of sulfur and fertilizers, the board claims.

Other features of the area are that labor is plentiful at economic wage scales; the city has an abundance of freight facilities and natural gas sells at one of the lowest fuel rates in the country.

Brownsville has a population of 50,000 including suburbs. It is located opposite the Mexican city of Matamoros, Tamps., of similar size. The city is 30 miles from the Gulf of Mexico.

The board of development says transportation facilities are excellent, including railroads, airlines and highways. The board will supply interested companies with further information upon request.

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If you manufacture dry chemicals sold in units up to 25 lbs., you probably can package effectively in paper bags—at substantial savings.

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Measure your present container against CHEM-PAK. Send for new *Package Evaluator* or ask to see a Union representative.

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Virginia-Carolina Cuts Costs

Uses new type Mobilift fork lift truck with bag attachment to raise production

Increased production from 25 tons an hour to 35 tons an hour and a reduction in manpower from seven to two workers has been credited by the Virginia-Carolina Chemical Corporation to the installation of Mobilift fork lift trucks with bag attachment.

The installation was made in 1948 at the Richmond, Va., plant of the company. Within thirty days after installation the increased production was noted along with the reduction in manpower.

The manpower reduction was made on the work done from the end of the conveyor line to the freight car, a distance of approximately 125 feet. The company formerly used an average of seven men to handle 25 tons of material on the operation, but reduced it to two because of the great efficiency of the Mobilift. One of the men operates the truck while the other inspects the car for nails and determines the amount of material to be loaded into each car.

The Mobilift truck has many advantages that make it a valuable aid in materials handling problems.

The patented multiple disc clutch is instantly activated by the Push-Pull Lev-R-Matic drive control. Power is smoothly transmitted without any gear shifting. The roller chain lift mechanism is operated by another multiple disc clutch. Thus the operator of the truck has instant fingertip control of forward-backward movement, and elevating and tilting. When the forward - backward lever is pushed, it stays engaged, leaving the operator's right hand free for

Operator watches as bags are loaded from conveyor belt onto bag attachment of Mobilift fork lift truck. He has clear visibility while he manipulates Lev-R-Matic controls to regulate movement of truck and attachment.

elevating, lowering or tilting while the unit is in motion.

The mobilift has a heavy-duty engine with a speed governed at 2,500 revolutions per minute.

Mobilift Model E, the improved "Stand-up" type used in the Virginia-Carolina Richmond plant, and illustrated on these pages, is designed for ease of operation and split-second maneuverability in restricted places where the operator must get on and off often to open doors or do other jobs in the course of his work.

Stand-up driving gives the operator maximum visibility forward and backward and speeds up operation of the machine.

The Lev-R-Matic controls are extra long for easier, more positive action. They are placed at the correct height for comfortable use.

Other features of the Mobilift truck are the following:

Lower truck silhouette which enables the driver to see the end of the forks more easily and gives him closer-in, all-around visibility.

Strong steel telescoping uprights, designed and constructed with proper balance and maximum strength at stress points.

Full view instrument panel with ignition switch, choke, oil pressure gauge and ammeter placed on slanted panel.

For speed and convenience, the starter switch is placed for knee action. The driver can depress the starter with his right knee. A large fan and an improved method of forcing air around the engine, out the side, away from the operator results in a cooler operation.

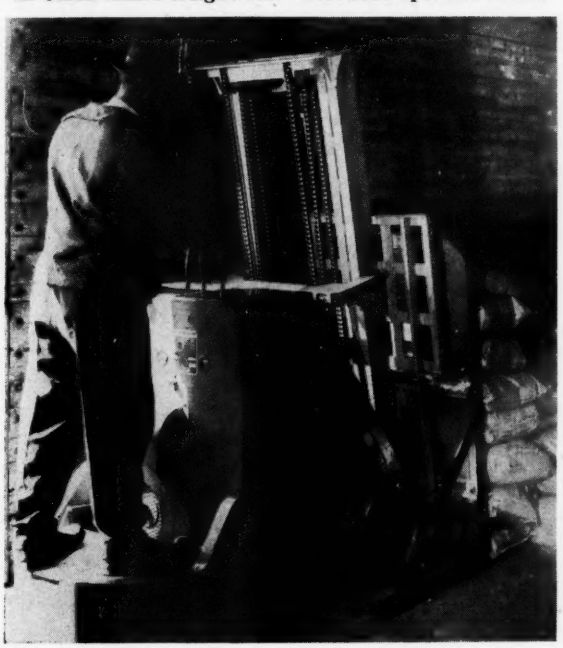
An automatic "dead-man" brake is another feature of the Mobilift. The brake is applied instantly when the operator raises his left foot or steps off the platform.

Regular maintenance of the Mobilift can be done by raising the double-hinged upper side panels. Servicing the battery, checking and refilling the hydraulic system, changing the oil filter cartridge and other maintenance jobs can be completed without removing the hood of the machine.

The multiple disc clutch can be serviced or replaced through the side panels without dismantling the Mobilift or removing other parts merely by removing the clutch cover plate. ◆

Neatly stacked bags are moved from the conveyor belt to the freight car on the Mobilift bag attachment, which uses a roller chain lift mechanism.

Operator lowers the bag attachment and deposits bags in stack inside freight car. Left foot operates brake.



Lev-R-Matic control is pulled to the rear to remove the bag attachment from the pile in quick easy operation.

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Phillips is producing nitrogen fertilizer materials at full capacity. But even our tremendous rate of production isn't always sufficient to meet today's demand. We'll do our best for you. Keep us in mind if you need nitrogen in any form.

AMMONIUM SULFATE—Phillips *66* Ammonium Sulfate is a free-flowing 21% nitrogen material! Mixes easily! Uniform crystals resist caking! Ideal for high-analysis mixed goods! A fine direct application material!

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NITROGEN SOLUTIONS—More N per dollar! Phillips *66* Nitrogen Solutions are well suited to the preparation of high-analysis fertilizers and the ammoniation of superphosphate. These three nitrogen solutions keep handling costs low . . . promote rapid, thorough curing!

ANHYDROUS AMMONIA—Tank car shipments of Anhydrous Ammonia (82% nitrogen) go out to Phillips contract customers from Phillips production facilities in the Texas Panhandle. Write our nearest district office for full information.

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FERTILIZER MATERIALS MARKET

New York

December 31, 1951

Sulphate of Ammonia

One Western synthetic producer raised the price of this material $3.00 per ton, effective January 1, 1952. No other price changes were reported and demand continues good from various areas.

Nitrate of Soda

Importers are being forced to allocate material among regular customers and demand continues excellent. No change has been reported in the price of domestic nitrate.

Ammonium Nitrate

One producer has advanced the price slightly, effective at once, and others are thought to follow this advance.

Nitrogenous Tankage

Demand continues good and offerings are rather limited. One large producer has practically shut down due to the shortage of raw material.

Castor Pomace

This material is still in short supply with producers operating on a limited basis, no offerings available and shipments being made against old contracts. Last sales on basis of $37.25 per ton, f.o.b. shipping points.

Organics

Organic fertilizer materials were firm in price with vegetable meals difficult to locate. Soybean meal was sought at the ceiling price of $74.00 per ton, f.o.b. Decatur, Ill., in bulk but for nearby shipment no material was available. Linseed meal was being produced in only negligible volume and offerings were particularly difficult to obtain. Cottonseed meal was firm at ceiling prices. Tankage last sold at $8.00 per unit of ammonia ($9.72 per unit N), f.o.b. Eastern shipping points, and blood at the same price.

Fish Meal

Only scattered lots of imported fish meal were available at prices ranging from $140.00 to $145.00 per ton at the ports. Demand was good from the feed trade.

Bone Meal

Due to the continued feed demand, feeding bone meal is selling at $80.00 per ton, f.o.b. Atlantic ports. Very little fertilizer bone meal is available.

Hoof Meal

Some imported material was sold at $7.25 per unit of ammonia ($8.82 per unit N), c.i.f. Atlantic port. Domestic material continues well sold up.

Superphosphate

This material is still short and no increase in the production has been noted. This shortage may have a serious effect on mixed goods later on. Triple super is still in heavy demand.

Potash

Several large cargoes of imported material have arrived recently at various ports. Domestic producers continue to ship against contracts but are sold out for the balance of this season.

Low Grade Ammoniates

Demand for cocoa shells, garbage tankage and sewage sludge was rather slow because of the shortage of superphosphate for mixing.

Charleston

December 31, 1951

Superphosphate continues the prime problem for fertilizer manufacturers. Other ingredients, such as liquid nitrogen and potash are in adequate supply but hard nitrogen such as ammonium nitrate and sulphate of ammonia are somewhat short of demand.

Organics.—Fertilizer organics continue in firm and relatively tight market position. Limited supplies of domestic nitrogenous are offered for February/May movement. Some suppliers are sold up. Prices range from $4.25 to $4.90 per unit of ammonia ($5.16 to $5.95 per unit N), bulk, f.o.b. production points. Imported nitrogenous offerings are light at around $6.25 per unit of ammonia ($7.59 per unit N), bagged, c.i.f. South Atlantic ports. Hoof and horn meal from abroad is around $7.00 per unit of ammonia ($8.51 per unit N), in bags, c.i.f.

Castor Pomace.—Domestic castor pomace productions are relatively light and current supplies already sold. Current price is $37.25 per ton in burlap bags, f.o.b. Northeastern production point, with $2.00 per ton allowance if shipment is made in paper bags. This material is guaranteed minimum 6.75 per cent ammonia. Imported castor pomace is offered at prices ranging from $44.50 to $47.50, in bags, ex-vessel Atlantic ports.

Dried Blood.—Unground dried blood is currently around $8.25 to $8.50 per unit of ammonia ($10.02 to $10.33 per unit N), bulk, f.o.b. Chicago area. The New York market is around $8.50 with limited business activity.

Potash.—Demand for contract material from domestic sources has improved and movement is relatively normal. Producers are urging fertilizer manufacturers to take in supplies before boxcar shortages develop on account of expected heavy grain movement.

Ground Cotton Bur Ash.—This form of potash, primarily in the form of carbonate of potash, continues available in good quantity for prompt and future shipment. Material testing approximately 40 per cent K_2O, can be obtained and delivers at prices comparing favorably with sulphate of potash.

Phosphate Rock.—Increased use of phosphate rock is indicated by larger sales during 1951 than were made in 1950. The increase was approximately 1,300,000 tons. Prices continue firm and movement steady to acidulators.

Superphosphate.—October production of superphosphate, basis 18 per cent A.P.A., was 906,000 tons, 34,000 tons less than in the same month for 1950. Sulphuric acid continues the limiting factor in the production of superphosphate and the market is extremely tight, with prices at ceiling levels.

Sulphate of Ammonia.—Supply position continues tight as the producers are shipping directly from production against an active demand. Threat of strike in the steel mills means possible curtailed production. Prices continue firm and unchanged at $40.00 to $45.00, bulk, f.o.b. shipping point.

Ammonium Nitrate.—Market is extremely tight with demand in excess of supply. One Western producer has advanced the price $3.00, effective January 1, 1952. The new price will be $64.00 in bags, f.o.b. works.

Nitrate of Soda.—Market position is firm and demand in seasonal dimensions. Stocks of imported material are considered adequate.

Philadelphia

December 31, 1951

While superphosphate is scarce and is likely to remain so, other materials are not too far behind requirements. Packing-house by-products are a little stronger, but equal to the demand. Potash shipments are moving about on schedule, and while all grades of solid nitrogen are reported tight, there is no pinch evident.

Sulphate of Ammonia.—This remains nominally tight and there is talk of a very likely price advance. There appears to be no abnormal demand, however.

Nitrate of Ammonia.—There is to be an advance in price effective January 1, 1952, of $3.00 per ton, bringing the price to $64.00 per ton in bags, carloads, at the producing plant.

Nitrate of Soda.—Market is reported firm with fair demand and ample stocks to meet all requirements.

Blood-Tankage-Bone.—Tankage is stronger at $8.50 per unit of ammonia ($10.33 per unit N) in Chicago, with blood in less demand at $8.25 ($10.02 per unit N). Hoof meal is offered at $7.25 per unit of ammonia ($8.82 per unit N) in the West. The demand for bone meal is far ahead of the supply and steamed grade is priced at from $80.00 to $90.00 per ton, with raw bone at $72.50.

Castor Pomace.—There are no offerings in the market, and shipments are confined to contract obligations.

Fish Scrap.—This is now exceedingly scarce with limited offerings of imported meal at ceiling price—$135.60 for 60 per cent protein grade.

Phosphate Rock.—Production is said to be increasing with supplies plentiful at present. Principal movement is against contracts.

Superphosphate.—Demand for contract shipments is increasing and the supply situation is definitely tight. There are no offerings in the open market.

Potash.—There is considerable improvement in the demand for contract deliveries and shipments are reported now about up to schedule. Currently there is no unusual demand.

Phosphate Rock Mine Production Up In '50

Phosphate rock mine production in the United States in 1950 reached a record high of 11,114,159 long tons, according to the Bureau of Mines. The amount exceeded the previous record of 1948, when 9,388,160 long tons were produced.

Increases were reported to the Bureau from Florida, Tennessee and most of the western states. Supplies of phosphate rock were plentiful and large quantities were added to the stocks in producer's hands.

A similar rise in sales was reported, from 8,986,933 long tons in 1949 to 10,253,552 tons in 1950. A decline in sales in several western states was counterbalanced by a rise in Florida and Tennessee.

USDA Scientists Fight Flies By Breeding More of Them

Report Excellent Results in War On Screw-Worm

Fighting insects by breeding thousands of them in laboratories and then releasing them may sound a bit paradoxical, but scientists at the USDA and the Bureau of Entomology and Plant Quarantine report excellent preliminary results in attacking the destructive screw-worm fly in just that way.

The new method, which has emerged from the laboratory into small-scale field tests under practical conditions, is a revolutionary scientific innovation in the use of radiant energy which it is hoped may be developed to eradicate the fly.

The insect causes tremendous financial loss to the livestock industry in the Southeast and west of the Mississippi river.

Not Yet Ready

Despite early success of the program, neither USDA nor the Bureau is ready yet to recommend a full scale campaign until they have an opportunity to make thorough field tests and to develop practical and economical applications of the scientific principles.

Here's how the new method works. Laboratory reared insects are exposed to radiation which sterilizes them. A treated female fly lays infertile eggs that do not hatch. When a radiated male has mated with a normal female in the laboratory, the eggs from the female are deposited as usual, but do not hatch into the maggots that damage livestock. The female fly mates only once, experiments have shown, and if this mating is with a treated male, none of the 300 or more eggs she lays in her lifetime will hatch.

By releasing five or ten times as many treated males as there are normal male worms in a mating area, eggs from most females are infertile and there is only slight reproduction.

Start In Southeast

The entomologists working on the problem say they hope elimination of the fly may be accomplished in the Southeast during two winters and the intervening summer by mass liberation of the radiated male screw-worm flies. Because of the small number of the flies that survive the Florida winter, liberation of the infertile flies will reduce swiftly succeeding generations of the insects, according to the plan.

Radiation has been done with X-rays in the preliminary experiments of the BEPQ. Arrangements have been made by the bureau with the Atomic Energy Commission for tests of atomic radiations as sources of sterilizing rays which might prove equally effective and less expensive for treatments.

Laboratory work has indicated close and accurate timing of treatment is necessary to make it effective. The pupal or resting stage of the fly lasts approximately eight days. If the pupae are irradiated at two days of age the rays do not sterilize the males. The sixth day has proved the most effective time for treatment, according to the report.

If the experiments continue to prove successful, USDA reports a mass eradication campaign might be set up as follows:

Mass rearing laboratories would be established ready for production of millions of the insects each week, starting early in the year. The insects would be irradiated on their sixth pupal day and the flies would be distributed over the infested area from airplanes.

Rearing and distributing would be continued through the normal season of the insects and into the following winter, unless the pest were eradicated before winter.

First research on the program was done at the Kerrville, Tex., laboratory of the BEPQ. X-ray equipment at a hospital in San Antonio was used in the experiments.

Small scale field tests are planned for an island off the west coast of Florida.

Pilot Plant

According to the Bureau, this will be a "pilot plant" scale test against wild flies designed to try the method under practical conditions and to give the scientists practical experience in mass rear-

ing, irradiation and liberation of the treated screw-worm flies.

Hopes for successful elimination of the pest are concerned only with the Southeast, where the insect was unknown until 1933.

As far as the western area is concerned, research workers have continued to improve treatments for infested animals. The BEPQ now is recommending "EQ-335," which contains 3 per cent lindane and 35 per cent pine oil. Lindane makes the remedy effective for a week, in place of the two to four days over which the older "Smear 62" was effective.

The history of the present experiments with the use of X-rays to sterilize flies goes back to earlier genetic studies with fruit-flies. Over-exposure of the flies, it was learned, made the flies sterile.

Value of the program for removal of the screw-worm menace runs to several millions of dollars each year—the loss in eastern infestation areas, the BEPQ estimates. Probable cost of a full-scale eradication program—providing the pilot-plant experiments are successful—would be approximately a million dollars, the Bureau estimates.

USDA Creates New Insect Research Division

Research will be conducted on the control of insects that destroy stored products in a new division of the Bureau of Entomology and Plant Quarantine, Division of Stored Product Insect Investigations.

Creation of the new research division was announced by the USDA.

Leader of the division is Randall Latta, longtime research worker in the Bureau, who has studied various methods of insect control. Latta will be assisted by R. T. Cotton and Dr. Lyman S. Henderson, Bureau authorities on the control of insects that affect stored products in homes and commercial establishments.

Several of the Bureau's research divisions have conducted investigations into the problem of insects affecting stored products. Better coordination of the research will be permitted by the reorganization move, the USDA reported. The public now will be able to obtain answers to problems from a single source and industries will have a more centralized contact point for discussing their problems.

Engler Named Manager Of Gifford-Wood Firm

Gifford-Wood company announces the appointment of Walter G. Engler, a sales engineer for the company for 25 years, as general sales manager of the Hudson (N. Y.)

Walter G. Engler

materials-handling equipment firm.

The appointment was announced by Orlan A. Johnson, president of the company.

Engler succeeds William E. Herb, whose recent death caused the vacancy.

Engler received a degree in mechanical engineering in Switzerland. He came to the United States in his early twenties and joined Gifford-Wood in 1929. He held

Industrial News

several sales executive positions in the conveying division of the company before taking charge of the mid-western territory with offices in Chicago, in 1942. He assumed management of the company's eastern office in New York four years ago.

Engler is a member of the American Society of Mechanical Engineers and a professional engineer registered in New York and Illinois.

12-1 Gas Clipper Has Many New Features

Easy accessibility to the engine compartment, a new type parking brake, and a steering column mounted instrument panel are features of the new Clark Gas Clipper.

Hood and seat are removed for access to the engine compartment by removing the radiator and air breather caps. For simple adjustments, louvers on both sides are hinged at the bottom and fold down to expose the engine compartment.

The gas cap is recessed into the dash, completely removed from the engine compartment. A pull type brake is located at the extreme corner of the floor board, clearing the center floor area for greater operator freedom.

An Elliot type axle is used with tie rods in the same plane. This and the relocation of steering knuckles close to the tire's dead-center shock point result in "no kick back" steering.

Cushion tires are included on all models and rubber torsional bushings are used at pivot mounting points. The double cylinder tilt system has been designed to give better upright stability with more positive control.

Access to the clutch housing is obtained by unscrewing two bolts and disengaging the accelerator pedal, thus cutting down the time necessary for changing the clutch.

Fill out the **Reader's Service Card** for more information. Ask for **12-1.**

Industry Urges Increase In Licensed DDT Exports

An increase in licensed exports of DDT by the Office of International Trade was urged recently by manufacturers so they can keep production on a stable basis.

Production of DDT for domestic use is slack from October through March, an export advisory committee of insecticide producers told the office. The committee recommended an increase in exports during this period so production need not be cut.

Industry spokesmen reported production of DDT is running higher than first estimates of 105 million pounds for the period October 1, 1951 to September 30, 1952. They claimed exports could be increased without hindering delivery of 85 million pounds of the insecticide required for domestic use during the coming year.

Quantitative limitations on export of benzene hexachloride also should be removed, because of an improved supply situation, the producers told the IOT.

Calcamium Cyanamide Still Available, Official Advises

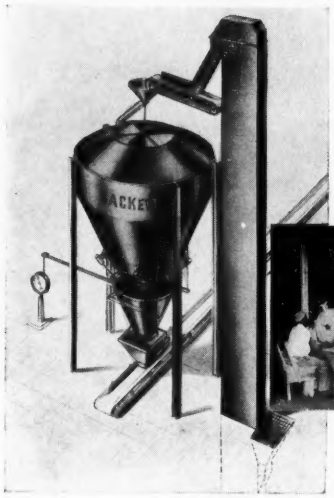
Calcium Cyanamide still is available for agricultural purposes, American Cyanamid company declares.

In refuting published reports to the contrary, Frank S. Washburn, director of the agricultural chemicals division of the company, said the material still is available in substantial tonnages for weed and soil disease control and for the defoliation of cotton and other crops. Also being produced in quantities sufficient to meet all normal agricultural requirements is potassium cyanate for weed control, fumigants and insecticides, Washburn stated.

An expansion program aimed at increasing the quantity of calcium cyanamide for agricultural purposes is under way, he added.

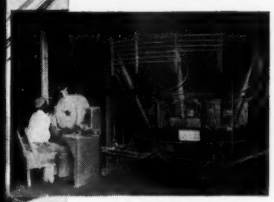
An increased demand for products based on the chemical-derivatives of calcium cyanamide has resulted from the country's defense economy, Washburn explained.

SACKETT FERTILIZER PROCESSING SYSTEMS PAY OFF



These fast fertilizer processing systems have reduced production costs in some plants as much as 65% . . . An estimated cost savings included with a Sackett survey of your production operations may even exceed this figure.

SACKETT ONE MAN BATCH-WEIGH SYSTEM

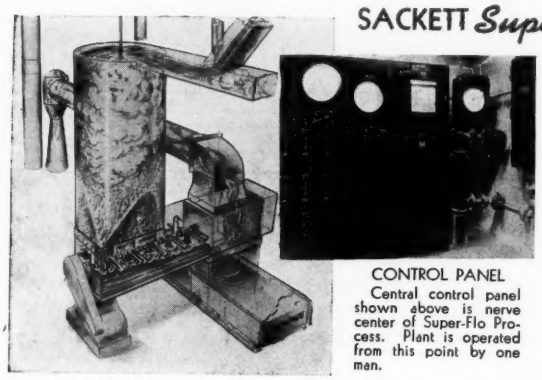


CONTROL PANEL

1. Eliminates waste of manpower.
2. Fast-acting weigh valves and printed weigh record provides more rapid and accurate weighing.
3. Circular design of storage hopper accelerates flow of ingredients through weigh valves . . . no corners or valley angles to retard flow of material.
4. Its compact design permits installation in existing buildings with minimum alterations.
5. The installation of this system does not, in any way, disturb existing mixing facilities.

Built in four sizes, 25 tons to 100 tons per hour.

SACKETT *Super-Flo* . . . A CONTINUOUS SUPERPHOSPHATE MANUFACTURING PROCESS



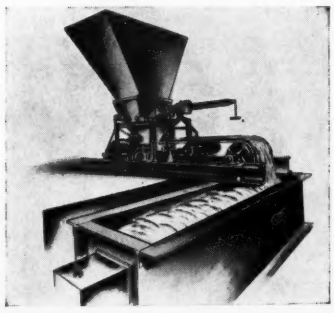
CONTROL PANEL
Central control panel shown above is nerve center of Super-Flo Process. Plant is operated from this point by one man.

This new Sackett-conceived and developed process produces a superphosphate of premium quality in either powdered or granular form. Its complete mechanization and centralized panel control brings to the industry entirely new conceptions of high production speeds, low manufacturing costs and quality product control.

These Sackett patented processes are built in three sizes, 25 tons to 75 tons per hour.

Exclusive suspended acidulation produces highly converted superphosphate of excellent quality.

SACKETT CONTINUOUS AMMONIATING SYSTEM



The patented Sackett Continuous Ammoniation System is now being offered in four sizes with capacities ranging from 25 tons per hour to 100 tons per hour. This highly efficient method of ammoniating superphosphates and mixed goods with solutions offers many important advantages and is easily installed in connection with existing basing equipment. Higher ammoniation rates are made possible by its accurate proportioning of solids and solutions and lower reactive temperatures due to its exclusive aerating action which takes place during ammoniation. This system is also built in pressurized design for anhydrous ammonia or solutions having high vapor pressures.

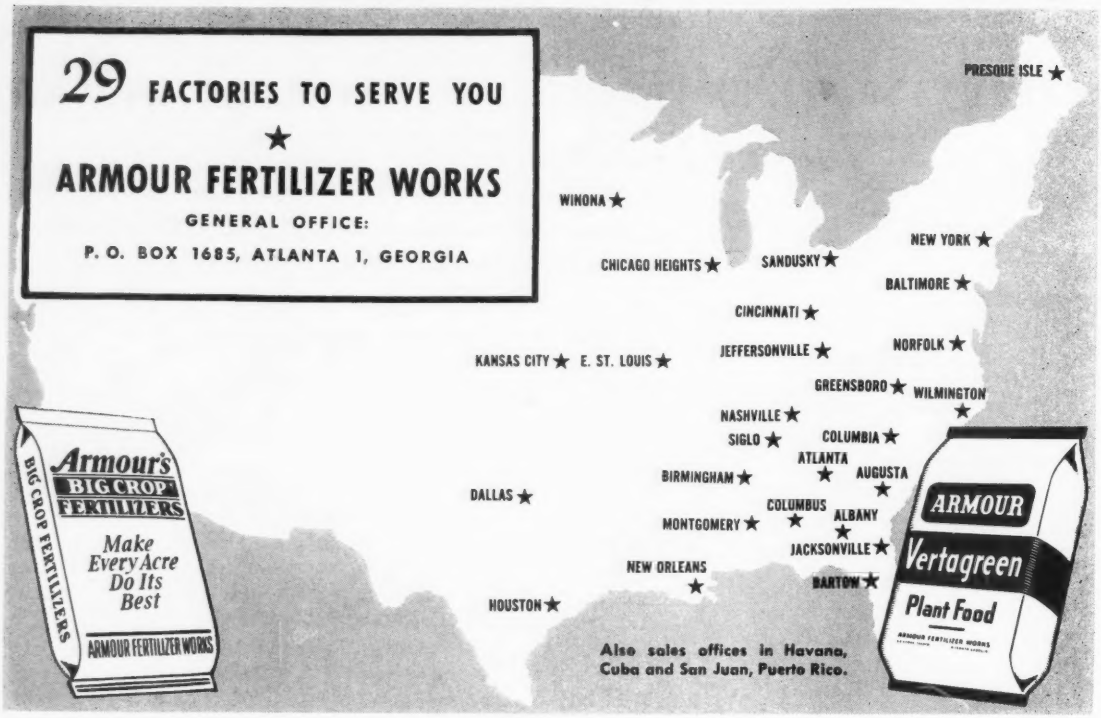
SACKETT
BALTIMORE

America's Foremost Designers and Builders

SUPERPHOSPHATE PLANTS • FERTILIZER MIXING PLANTS • RELATED PRODUCTION EQUIPMENT

THE A. J. SACKETT & SONS CO., 1707 S. HIGHLAND AVENUE, BALTIMORE 24, MD.

Architects and Manufacturing Engineers to the Fertilizer Industry since 1897



Ashcraft-Wilkinson Co.

Fertilizer Materials — *Feeding Materials*

ALL FERTILIZER MATERIALS

FOREIGN AND DOMESTIC

Agricultural Chemicals **Sulphate of Ammonia**
Organic Ammoniates **Sulphur**

Exclusive Distributors: **DUVAL SULPHUR AND POTASH COMPANY**

Vegetable Oil Meals and Feedstuffs

HOME OFFICE: ATLANTA, GA.

BRANCHES:
NORFOLK, VA.
CHARLESTON, S. C.
GREENVILLE, MISS.
TAMPA, FLA.
COLUMBUS, OHIO

CABLE ADDRESS:
ASHCRAFT

SUBSIDIARIES:
INTERSTATE MILLS, INC.
CAIRO, ILL.

INTERSTATE WAREHOUSE
CAIRO, ILL.

Industrial News

National Research Council Lauds Benefits of Pesticides

Further opposition to the theory that the newer pesticides are the cause of mysterious diseases and deaths was given recently by the National Research Council.

The Food Protection Committee of the council issued a statement that evidence is completely lacking that consumption of foods upon which pesticides have been used endangers the health of the people.

Dr. H. E. Longenecker, dean of the graduate school of research in the natural sciences, University of Pittsburgh, is chairman of the Food Protection Committee of the National Research Council. Members of the committee include agricultural professors from all parts of the country.

The committee statement declares that farm chemicals are essential in the production and processing of many crops. Panels of scientists, nutritionists, government specialists and industrial research directors based their report on a year's study of data on the benefits and possible hazard of chemicals used in connection with foods.

The committee statement said, "Contrary to some ideas that have been circulated, reliable food processors have not reduced the nutritional quality of our foods or created inferior products through the use of chemical additives."

On the contrary, according to the report, "the quality and sanitary characteristics of our foods have been improving."

As a result of the aid of chemicals in food protection, the statement points out, one farm worker now produces food for 14 persons, a gain of 35 per cent over 1941.

"In the face of increasing difficulties from disease and insect pests America's food today is more abundant, nutritious and safe," the committee asserts.

The committee explains that the use of pesticides to control insects, diseases and rodents has caused some concern because some of these pesticides are toxic to warm-blooded animals. But modern agriculture finds them indispensable, and they cannot be supplemented by organic farming, the committee stated. Organic matter in the soil is valuable but does not guarantee against infestation, the report states.

The Food Protection Committee stresses the fact that "pests must be controlled, or the food supply of the nation will increase markedly in quantity and quality. Chemicals are destined to continue to play as much a part of farming as the tractor."

Because of big recent development of farm chemicals, the committee recommended future establishment of a program by the government and industry to cope with the problems involved in the development and use of the chemicals.

12-2 HM Hough Payloader Features Four Wheel Drive

Four wheel drive is incorporated for the first time in tractor shovel design in the new model HM Hough Payloader, according to a bulletin of the Frank G. Hough Company. Tremendous traction and flotation is claimed for the new model because of the four wheel drive and pneumatic tires. It has a heavy duty transmission with a selection of four forward speeds ranging from 2 to 16 miles per hour and four corresponding reverse speeds 1½ times faster. Greater digging power for tough jobs thus is assured as well as fast travel and maneuvering speeds. A separate directional control lever allows instant forward and reverse control independently of the regular gear shift lever.

Fill out a **Reader's Service Card** for further information. Ask for **12-2.**

How You Can Get

Free Information

On each of the two postage-paid postcards below you can request further information on four items described on this and the Industrial News section of this issue. Fill out one quarter section for each item in which you are interested.

12-3 Tote-All Conveyor

One of the greatest single opportunities for reducing operating costs in industrial plants lies in more efficient materials handling. The Tote-All conveyor will help make this job more efficient and easier, according to a booklet issued by Lake Shore Engineering Company. Use of lightweight, portable power-driven belt conveyors for handling bulk and packaged materials is an economical means for replacing hand labor with power equipment, the company states. The conveyors are available with gasoline engines, electric motors or hydraulic drive, and can be used for floor-to-floor handling of materials.

12-4 High Speed Mills

Maximum efficiency in grinding of chemicals is assured with its improved No. 52 High-Speed Three-Roller Mills, the Charles Ross and Son Company claims in a new bulletin. Chamber bored for full-length water cooling and temperature control to assure uniform grinding. The mills are made with large water cooling chambers and uniform thin wall construction, permitting high speed operation without excessive heating of rolls. The gears are extra heavy to provide a high safety factor for overload.

12-5 Load Handling Devices

Efficiency and utility of the power industrial truck can be greatly increased through the use of special load handling features, the Elwell-Parker Electric Company asserts in a new brochure. Such devices as revolving fork, roll paper clamp, hook and boom, electro-magnet, ladle pourer, remote control, and upender are described and illustrated, to aid farm chemicals manufacturers to select and apply the fixtures.

12-6 Dust Collector

Health and safety standards in industrial plants can be improved by using Aeroturn dust collectors, according to

Here is a list of the NEW PRODUCTS and BULLETINS described on this and the Industrial News pages of this issue giving their monthly code number.

- **12-1** Gas Clipper
- **12-2** New Payloader
- **12-3** Tote-All Conveyor
- **12-4** High Speed Mills
- **12-5** Load Handling
- **12-6** Dust Collector
- **12-7** Fertilizer Mixer
- **12-8** Chemical Dryer
- **12-9** R.T.R. Uni-Blender
- **12-10** Durcopump
- **12-11** Mobilift
- **12-12** Surface Thermometer
- **12-13** Bag Closer

FILL OUT READER SERVICE CARDS

FARM CHEMICALS Code Number
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Title....
Company....
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Co. Address....
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Co. Address....
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literature recently printed by Turner and Haws Company. Savings in operating and maintenance costs also are provided by using the collectors, which collect virtually 100 per cent of dust in the area, the company claims. Development of the reverse-air jet cleaning apparatus permits the use of hard-pressed wool felt as the filtration medium, thus providing greater efficiency. Collectors can be supplied in sizes and arrangements to suit any installation requirement—inside or out.

12-7 Fertilizer Mixer

A standard fertilizer mixer with a dust-proof housing over the discharge chute and a pulley for belt drive has many advantages for fertilizer formulators and mixers, according to the Worthington Pump and Machinery Corporation, which has issued a bulletin on the mixers. Available in one-half, one and two ton capacities, the mixer provides a completely homogenous mixture, overcoming the tendency of ingredients to segregate or stratify, according to the company. A hinged gate in the charging chute and an ammonia inlet connection are provided as standard equipment.

12-8 Chemical Dryer

If you need a dryer for sulfates, phosphates, nitrates or other fine chemicals, the C. O. Bartlett & Snow Company thinks it has just the machine for the job in its Style J dryers, described in a recent bulletin of the company. Ranging from 30″ to 120″ in diameter, and from 8′ to 90′ in length, the dryers can be operated either parallel or counter-flow. Some of the dryers have totally enclosed screw feed and discharge conveyors. They can be fitted with knockers to prevent damp material from adhering to the interior cylinder walls, if necessary, the literature states.

12-9 R. T. R. Uni-Blender

A universal demand by mixers of field-strength products and formulators of concentrates for a complete, compact, pre-tested, moderately priced insecticide plant, resulted in development of the R. T. R. Uni-Blendor. The unit is "Ready To Run" profitably, immediately upon being received, A. E. Poulsen & Company explains. Improved service to customers, increase in sales, reduced operating expenses and increase in net profit are some of the advantages of using the Uni-Blendor, which is described in a bulletin issued by the company.

12-10 Durcopump

The chemical industry's standard for handling corrosive solutions is the way the Duriron Company, Inc., describes the Series R Durcopump. It is a heavy duty pump designed specifically for severe corrosive service. Outstanding features of the instrument are a rugged cast iron frame, vertically split casting with integral stuffing box, minimum of six rings of packing, with the first ring seated wholly against the bottom of the stuffing box, and renewable shaft sleeve sealed to the impeller head with a super-finish joint.

A bulletin recently issued by the company gives a complete description of the pump along with a pump selector table. The table indicates the Durcopump series number, rated water horsepower consumption, and speed of operation.

12-11 Mobilift

Manpower can be cut and production increased by use of Mobilift fork trucks with bag attachment, the company states in a new bulletin. A special patented disc clutch is activated instantly by Push-Pull Lev-R-Matic drive control. A roller chain lift mechanism is operated also by a disc clutch. Another important feature of the truck is an automatic "dead-man" brake which goes on instantly when the operator raises his left foot or steps off the platform.

12-12 Surface Thermometer

The first surface temperature thermometer designed exclusively for the purpose of indicating surface temperatures has been developed by the Pacific Transducer company division of Clarkstan Corporation. The company claims the thermometer may be used in the chemicals industry for fast and accurate checking of the outside temperature of pipes, electric motors, cold chambers, walls and ceilings.

12-13 Bag Closer

Machine closing improves the appearance of filled bags and keeps them in good condition for further use by eliminating tears and holes. These are just two of the advantages claimed for the Fischbein Portable bag closer. The unit is completely portable, weighs only 10½ pounds, and is sturdy, handy and practical, according to a bulletin issued by the company. The unit can be used for all types of fertilizer bags. It closes 200 bags in an hour and needs no supports or plant space.

FILL OUT READER SERVICE CARDS

FIRST CLASS
PERMIT No. 386
Sec. 510, P. L. & R.
Philadelphia, Pa.

BUSINESS REPLY CARD
No Postage Necessary if Mailed in the United States

Postage Will Be Paid By

FARM CHEMICALS
317 North Broad Street
Philadelphia 7, PA.

FIRST CLASS
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Sec. 510, P. L. & R.
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BUSINESS REPLY CARD
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FARM CHEMICALS
317 North Broad Street
Philadelphia 7, Pa.

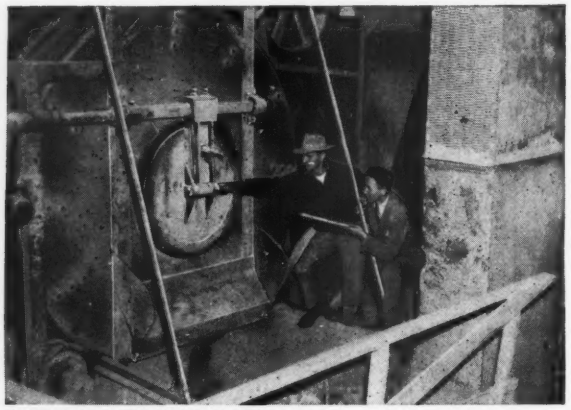
TENNESSEE'S FIRST farmer owned co-operative plant-food plant is seen above. Located just south of Nashville, this plant began production of Co-op brand mixed fertilizer late in January, 1951.

Distributed throughout all the counties of Tennessee, Co-Op Brand fertilizer is applied principally to corn, cotton, tobacco and pasture. Like so many leading fertilizer mixers, Co-Op uses Spensol.

Co-op of Tennessee

. . . Another Spensol User

HUGE QUANTITIES OF SPENSOL (Spencer Nitrogen Solutions) are produced each day in plants like this one at Pittsburg, Kansas. Because of its growing reputation for producing well-conditioned fertilizers at low cost, Spensol is in demand.



THERE'S NO CHARGE for scientific advice from Spencer's Technical Services Department. If you have a production problem, call upon this staff of experts. Even if you're not a Spensol customer, take advantage of this free Spencer service.

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Southeastern District Sales Office: 412 Chandler Bldg., Atlanta, Ga.
Works: Pittsburg, Kansas • Henderson, Ky. • Chicago, Ill.

America's Growing Name in Chemicals

Tiedjens Named Research Head at 'Na-Churs'

Dr. Victor A. Tiedjens has been appointed director of research and senior chemist in charge of liquid fertilizer formulas for "Na-Churs" Plant Food Company, Marion, O.

He has been director of the Virginia Truck Experiment Station since 1945. He is a vice president of the American Association for the Advancement of Science.

Tiedjens is an expert in the field of plant nutrients in liquid form. He has worked experimentally for 20 years in the field and is one of the leading agricultural scientists in the United States.

He received his Bachelor's and Master's degrees from the University of Wisconsin in 1921 and 1922, respectively.

He studied at Harvard and Rutgers Universities after doing research work as assistant research professor in vegetable gardening at Massachusetts State College. He received his doctorate at Rutgers in 1932, writing his thesis in colloid chemistry.

Dr. Victor A. Tiedjens

In 1935 Tiedjens invented soil-less culture equipment, after doing experimental work in the use of plant nutrients in solution. He was employed by two large oil companies in 1940 to develop vegetable gardens on the islands of Aruba and Curacao in the Netherlands West Indies, using the soil-less culture process.

He was appointed director of the Virginia Truck Experiment Station at Norfolk in 1945 and also was named USDA coordinator for the regional research laboratory at Philadelphia and Charleston, S. C.

Dr. Tiedjens is the author of several books, including "Chemical Gardening for the Amateur," "Practical Guide to Productive Farming," and "Gardening." His other writings include "The Vegetable Encyclopedia and Gardening Guide," sixteen scientific articles in biology, chemistry and soils, six experiment station bulletins and numerous magazine articles.

BUYERS' GUIDE •

Classified Index to Advertisers in "Farm Chemicals"

AGRICULTURAL CONSULTANTS
Bailey & Lerch, Washington, D. C.

AMMONIA—Anhydrous and Liquor
Barrett Div., Allied Chemical & Dye Corp., New York City
Commercial Solvents Corp., New York City
Lion Oil Co., El Dorado, Ark.
Phillips Chemical Co., Bartlesville, Okla.
Spencer Chemical Co., Kansas City, Mo.

AMMONIUM NITRATE
Lion Oil Co., El Dorado, Ark.
Phillips Chemical Co., Bartlesville, Okla.
Spencer Chemical Co., Kansas City, Mo.

BAG MANUFACTURERS—Burlap
Bemis Bros. Bag Co., St. Louis, Mo.
Mente & Co., Inc., New Orleans, La.
Virginia-Carolina Chemical Corp., Richmond, Va.

BAG MANUFACTURERS—Cotton
Bemis Bro. Bag Co., St. Louis, Mo.
Mente & Co., Inc., New Orleans, La.
Virginia-Carolina Chemical Corp., Richmond, Va.

BAG MANUFACTURERS—Paper
Bemis Bro. Bag Co., St. Louis, Mo.
International Paper Co., Bagpak Div., New York City
Hammond Bag & Paper Co., Wellsburg, W. Va.
Jaite Company, The, Jaite, Ohio
Kraft Bag Corporation, New York City
Mente & Co., Inc., New Orleans, La.
Raymond Bag Co., Middletown, Ohio
Union Bag & Paper Corp., New York City
Virginia-Carolina Chemical Corp., Richmond, Va.

BAGS—Dealers and Brokers
Ashcraft-Wilkinson Co., Atlanta, Ga.
McIver & Son, Alex, M., Charleston, S. C.

BAG CLOSING MACHINES
International Paper Co., Bagpak Div., New York City

BAG PRINTING MACHINES
Schmutz Mfg., Louisville, Ky.

BAGGING MACHINES—For Filling Sacks
Atlanta Utility Works, The, East Point, Ga.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman Foundry and Machine Co., Aurora, Ind.

BONE PRODUCTS—Bone Black
American Agricultural Chemical Co., New York City
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Jackle, Frank R., New York City
McIver & Son, Alex M., Charleston, S. C.
Woodward & Dickerson, Inc., Philadelphia, Pa.

BORAX AND BORIC ACID
American Potash and Chem. Corp., New York City

BROKERS
Ashcraft-Wilkinson Co., Atlanta, Ga.
Jackle, Frank R., New York City
Keim, Samuel D., Philadelphia, Pa.
McIver & Son, Alex. M., Charleston, S. C.
Woodward & Dickerson, Inc., Philadelphia, Pa.

BUCKETS—For Hoists, Cranes, etc.
Hayward Company, The, New York City

BUCKETS—Elevator
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman Foundry and Machine Co., Aurora, Ind.

CARS AND CART
Atlanta Utility Works, The, East Point, Ga.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman Foundry and Machine Co., Aurora, Ind.

CASTOR POMACE
Ashcraft-Wilkinson Co., Atlanta, Ga.
McIver & Son, Alex. M., Charleston, S. C.

CHEMICALS
American Agricultural Chemical Co., New York City
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Barrett Div., Allied Chemical & Dye Corp., New York City
Commercial Solvents Corp., New York City
Davison Chemical Corporation, Baltimore, Md.
International Minerals & Chemical Corporation Chicago, Ill.
Lion Oil Company, El Dorado, Ark.
Koppers Company, Inc., Tar Products Div., Pittsburgh, Pa.
McIver & Son, Alex. M., Charleston, S. C.
Phillips Chemical Co., Bartlesville, Okla.
Spencer Chemical Co., Kansas City, Mo.
Synthetic Nitrogen Products Corp., New York City
United States Steel Corp., New York City
Virginia-Carolina Chemical Corp., Richmond, Va.
Woodward & Dickerson, Inc., Philadelphia, Pa.

CHEMISTS AND ASSAYERS
Gascoyne & Co., Baltimore, Md.
Shuey & Company, Inc., Savannah, Ga.
Wiley & Company, Baltimore, Md.

CONDITIONERS
Ashcraft-Wilkinson Co., Atlanta, Ga.
Jackle, Frank R., New York City
Keim, Samuel D., Philadelphia, Pa.
McIver & Son, Alex. M., Charleston, S. C.
National Lime & Stone Co., Findlay, Ohio

COTTONSEED PRODUCTS
Ashcraft-Wilkinson Co., Atlanta, Ga.
Jackle, Frank R., New York City
McIver & Son, Alex. M., Charleston, S. C.

DRYERS
Sackett & Sons Co., The A. J., Baltimore, Md.

ENGINEERS—Chemical and Industrial
Chemical Construction Corp., New York City
Fairlie, Inc., Andrew M., New York City
General Industrial Development Corp., New York City
Marietta Concrete Corporation, Marietta, Ohio
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman Foundry and Machine Co., Aurora, Ind.
Titlestad Corporation, Nicolay, New York City

FERTILIZER (Mixed) MANUFACTURERS
American Agricultural Chemical Co., New York City
Armour Fertilizer Works, Atlanta, Ga.
Davison Chemical Corporation, Baltimore, Md.
International Minerals & Chemical Corporation, Chicago, Ill.
Southern States Phosphate & Fertilizer Co., Savannah, Ga.
Virginia-Carolina Chemical Corp., Richmond, Va.

FISH SCRAP AND OIL
Ashcraft-Wilkinson Co., Atlanta, Ga.
Jackle, Frank R., New York City
McIver & Son, Alex. M., Charleston, S. C.
Woodward & Dickerson, Inc., Philadelphia, Pa.

HOPPERS
Atlanta Utility Works, The, East Point, Ga.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman Foundry and Machine Co., Aurora, Ind.

IMPORTERS, EXPORTERS
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Southern States Phosphate & Fertilizer Co., Savannah, Ga.
Woodward & Dickerson, Inc., Philadelphia, Pa.

INSECTICIDES
American Agrictultural Chemical Co., New York City
Andrews Sales, Inc., W. R. E., Philadelphia, Pa.
Ashcraft-Wilkinson Co., Atlanta, Ga.

LIMESTONE
American Agricultural Chemical Co., New York City
Ashcraft-Wilkinson Co., Atlanta, Ga.
McIver & Son, Alex. M., Charleston, S. C.
National Lime & Stone Co., Findlay, Ohio

LOADERS—Car and Wagon
Hough Co., The Frank G., Libertyville, Ill.
Sackett & Sons Co., The A. J., Baltimore, Md.

MACHINERY—Acid Making and Handling
Atlanta Utility Works, The, East Point, Ga.
Chemical Construction Corp., New York City
Monarch Mfg. Works, Inc., Philadelphia, Pa.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman Foundry and Machine Co., Aurora, Ind.

MACHINERY—Ammoniating
Sackett & Sons Co., The A. J., Baltimore, Md.

MACHINERY—Grinding and Pulverizing
Atlanta Utility Works, The, East Point, Ga.
Bradley Pulverizer Co., Allentown, Pa.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman Foundry and Machine Co., Aurora, Ind.

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BUYERS' GUIDE

For Alphabetical List of Advertisers, see page 52

MACHINERY—Material Handling
Atlanta Utility Works, The, East Point, Ga.
Hayward Company, The, New York City
Hough Co., The Frank G., Libertyville, Ill.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman Foundry and Machine Co., Aurora, Ind.

MACHINERY—Mixing, Screening and Bagging
Atlanta Utility Works, The, East Point, Ga.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman Foundry and Machine Co., Aurora, Ind.

MACHINERY—Power Transmission
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman Foundry and Machine Co., Aurora, Ind.

MACHINERY—Superphosphate Manufacturing
Atlanta Utility Works, The, East Point, Ga.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman Foundry and Machine Co., Aurora, Ind.

MANGANESE SULPHATE
McIver & Son, Alex. M., Charleston, S. C.

MINOR ELEMENTS
Andrews Sales, Inc., W R.. E., Philadelphia, Pa.
Tennessee Corporation, Atlanta, Ga.

MIXERS
Atlanta Utility Works, The, East Point, Ga.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman Foundry and Machine Co., Aurora, Ind.

NITRATE OF SODA
American Agricultural Chemical Co., New York City
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Barrett Div., Allied Chemical & Dye Corp., New York City
International Minerals & Chemicals Corporation, Chicago, Ill.
McIver & Son, Alex. M., Charleston, S. C.

NITROGEN SOLUTIONS
Barrett Div., Allied Chemical & Dye Corp., New York City
Lion Oil Company, El Dorado, Ark.
Phillips Chemical Co., Bartlesville, Okla.
Spencer Chemical Co., Kansas City, Mo.

NITROGENOUS ORGANIC MATERIAL
American Agriculture Chemical Co., New York City
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
International Minerals & Chemical Corporation, Chicago, Ill.
Jackle, Frank R., New York City
McIver & Son, Alex. M., Charleston, S. C.
Woodward & Dickerson, Inc., Philadelphia, Pa.

NOZZLES—Spray
Monarch Mfg. Works, Philadelphia, Pa.
Spraying Systems Co., Bellwood, Ill.

PHOSPHATE ROCK
American Agricultural Chemical Co., New York City
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
International Minerals & Chemical Corporation, Chicago, Ill.
McIver & Son, Alex. M., Charleston, S. C.
Virginia-Carolina Chemical Corp., Richmond, Va.

PLANT CONSTRUCTION—Fertilizer and Acid
Atlanta Utility Works, The, East Point, Ga.
Chemical Construction Corp., New York City
Fairlie, Inc., Andrew M., New York City
General Industrial Development Corp., New York City
Monsanto Chemical Co., St. Louis, Mo.
Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman Foundry and Machine Co., Aurora, Ind.
Titlestad Corporatian Nicolay, New York City

POTASH SALTS—Dealers and Brokers
American Agricultural Chemical Co., New York City
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
International Minerals & Chemical Corporation, Chicago, Ill.
Jackle, Frank R., New York City
McIver & Son, Alex. M., Charleston, S. C.
Symthetic Nitrogen Products Corp., New York City

POTASH SALTS—Manufacturers
American Potash and Chemical Corp., New York City
Potash Co. of America, New York City
International Minerals & Chemical Corporation, Chicago, Ill.
United States Potash Co., New York City

PRINTING PRESSES—Bag
Schmutz Mfg. Co., Louisville, Ky.

REPAIR PARTS AND CASTINGS
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Sackett & Sons Co., The A. J., Baltimore, Md.
Stedman Foundry and Machine Co., Aurora, Ind.

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SCREENS
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Sackett & Sons Co., The A. J., Baltimore, Md.
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SPRAYS
Monarch Mfg. Works, Inc., Philadelphia, Pa.
Spraying Systems Co., Bellwood, Ill.

STORAGE BUILDINGS
Marietta Concrete Corporation, Marietta, Ohio

SULPHATE OF AMMONIA
American Agricultural Chemical Co., New York City
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Barrett Div., Allied Chemical & Dye Corp., New York City
Jackle, Frank R., New York City
Koppers Co., Inc., Tar Products Div., Pittsburgh, Pa.
Lion Oil Co., El Dorado, Ark.
McIver & Son, Alex. M., Charleston, S. C.
Phillips Chemical Co., Bartlesville, Okla.
United States Steel Corp., New York City
Woodward & Dickerson, Inc., Philadelphia, Pa.

SULPHATE OF POTASH—MAGNESIA
International Minerals & Chemicals Corporation, Chicago, Ill.

SULPHUR
Ashcraft-Wilkinson Co., Atlanta, Ga.
Texas Gulf Sulphur Co., New York City

SULPHURIC ACID
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Ashcraft-Wilkinson Co., Atlanta, Ga.
International Minerals & Chemical Corporation, Chicago, Ill.
McIver & Son, Alex. M., Charleston, S. C.
Southern States Phosphate Fertilizer Co., Savannah, Ga.
U.S. Phosphoric Products Division, Tennessee Corp., Tampa, Fla.
Virginia-Carolina Chemical Corp., Richmond, Va.

SUPERPHOSPHATE
American Agricultural Chemical Co., New York City
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
Davison Chemical Corporation, Baltimore, Md.
International Minerals & Chemical Corporation, Chicago, Ill.
Jackle, Frank R., New York City
McIver & Son, Alex. M., Charleston, S. C.
Southern States Phosphate Fertilizer Co., Savannah, Ga.
U.S. Phosphoric Products Division, Tennessee Corp., Tampa, Fla.
Virginia-Carolina Chemical Corp., Richmond, Va.

SUPERPHOSPHATE—Concentrated
Armour Fertilizer Works, Atlanta, Ga.
International Minerals & Chemical Corporation, Chicago, Ill.
U.S. Phosphoric Products Division, Tennessee Corp., Tampa, Fla.
Virginia-Carolina Chemical Corp., Richmond, Va.

TANKAGE
American Agricultural Chemical Co., New York City
Armour Fertilizer Works, Atlanta, Ga.
Ashcraft-Wilkinson Co., Atlanta, Ga.
International Minerals & Chemical Corporation, Chicago, Ill.
Jackle, Frank R., New York City
McIver & Son, Alex. M., Charleston, S. C.
Woodward & Dickerson, Inc., Philadelphia, Pa.

VALVES
Atlanta Utility Works, The, East Point, Ga.
Monarch Mfg. Works, Inc., Philadelphia, Pa.

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Industry Finally Gets

Sulfur Orders

THE farm chemicals industry finally received sulfur and sulfuric acid limitations from the National Production Authority. The orders, pending for several months, had an effective date of January 1, 1952.

Sulfur Limitation Order

Main point of the sulfur order was to restrict use of the substance to 90 per cent of that used in the calendar year 1950.

Order M-69, amended, applies on a company, rather than a plant, basis. If, however, NPA finds that interplant transfers of sulfur by any company have caused severe maldistribution of any material produced from sulfur, NPA will take appropriate remedial action. In addition the order prohibits suppliers from delivering sulfur to purchasers who do not furnish written certification of compliance with its provisions.

Further provisions of the order state that "if in any calendar month a person uses less sulfur than he may use in that month under the order, he may use an additional amount during the next succeeding five months equal to the difference between the amount authorized and the amount actually used."

In addition, sulfur mined or recovered by means of facilities or equipment installed and in production no earlier than June 24, 1950, may be used for any purpose during any month.

Sulfuric Acid Order

The sulfuric acid order, M-94, requires that all sulfuric acid producers maintain the same ratio between sales and captive use of their total production of sulfuric acid which they established by actual distribution in the calendar year 1950.

According to the NPA, the purpose of the order "is to prevent serious maldistribution of sulfuric acid."

The effect of the order will be to require each producer to offer for sale each month a percentage of his scheduled monthly production of sulfuric acid equal to the percentage thereof which he sold in 1950, unless otherwise authorized by the NPA.

The provisions do not apply to sulfuric acid which has been mined or recovered by the producer by means of facilities or equipment installed and in operation after June 24, 1950, or produced from sulfur bearing raw materials other than elemental sulfur after the same date.

Neither M-69 nor M-94 establishes procedures by which new plants may obtain sulfur or sulfuric acid. According to current legislation, they are entitled to receive a "share" of sulfur.

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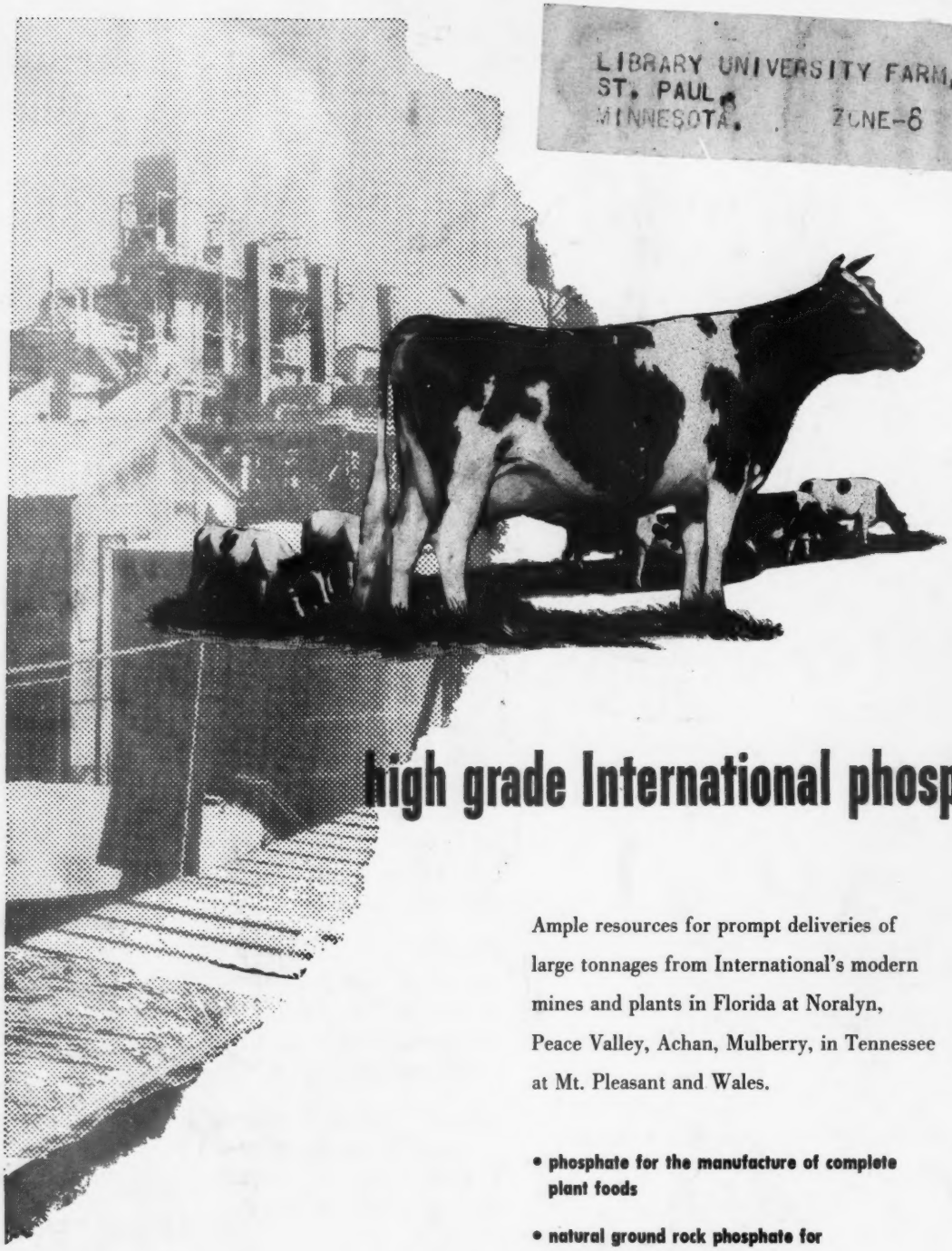

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